GAS

ENGINEERING • UTILIZATION • LOAD-BUILDING • MANAGEMENT

HUNDREDS OF STORES FEATURE ROBERTSHAW

Here's how some of them do it—

Snellenberg, Philadelphia—"A thoroughly modern and efficient range with Robertshaw heat control for correct cooking temperature." **Spears, N. Y.**—"You'll put this down as a MUST—a gas range with Robertshaw Oven-Heat-Control." **Loveman, Joseph & Loeb, Birmingham**—"Of course, it has the Robertshaw Oven-Heat-Control." **Shillito's, Cincinnati**—"Equipped with all conveniences for easier cooking! Robertshaw thermostatic heat control." **Ben Duffie, Inc., Houston**—"Robertshaw Oven-Heat-Control frees you from oven watching. Cooks dinner while you're out for hours. Put cake in, forget it—take out perfectly baked cake, evenly browned." **The Music Mart, El Paso**—"Robertshaw Oven-Heat-Control, as fine as money can buy." **Titche-Goettinger Co., Dallas**—"The famous Robertshaw Oven-Heat-Control." **Thalhimers, Richmond**—"This is considered the finest Robertshaw heat control . . . maintains the exact heat required for any baking operation . . . you merely set the dial to the required temperature."

FOOTSTEPS *show the way*

Merchandising men in important stores all over the country play up ROBERTSHAW in their local range advertising.

Some of the many stores which add the extra selling appeal of ROBERTSHAW are listed above. Read what they say—then feature ROBERTSHAW in your retail range advertising. Feature Robertshaw-equipped ranges on your sales floor. It will pay you!

Robertshaw Thermostat Company • Youngwood, Penna.

It pays to feature **ROBERTSHAW**

OVEN-HEAT-CONTROL

JUNE 1938 • • 25 CENTS

EMCO

They Work together like Pen and Ink

DOMESTIC METERS and REGULATORS

The installation of EMCO Domestic Regulators gives your customers gas delivered to the burners of heating units and household appliances at proper and constant pressures, thus eliminating the annoyance and inconvenience caused by pressure fluctuations and greatly adding to the factor of safety. When any EMCO Domestic Meter is used in combination with an EMCO Regulator, you not only solve an important distribution problem but also, through accurate measurement, remove the possibility of disputes about questionable charges and the loss of consumer good will.

You can form a perfect combination from the complete line of EMCO Domestic Meters and Regulators that will solve any problem of gas measurement and pressure regulation.

EMCO Domestic Gas Meters are made in four types; the Standard, Curb Box, Tin and Ironclad. Each type is particularly qualified to fulfill the accurate measurement requirements of a specific domestic service. All are carefully constructed from the finest selected materials.

EMCO APPLIANCE REGULATOR

EMCO *Ejector* SERVICE REGULATOR

EMCO Domestic Regulators include the Ejector Service Regulator, for high or low pressure service lines, and the EMCO Appliance Regulator, spring or weight loaded type for domestic and commercial gas appliances and heating equipment units.

PITTSBURGH EQUITABLE METER COMPANY

MERCO NORDSTROM VALVE CO.

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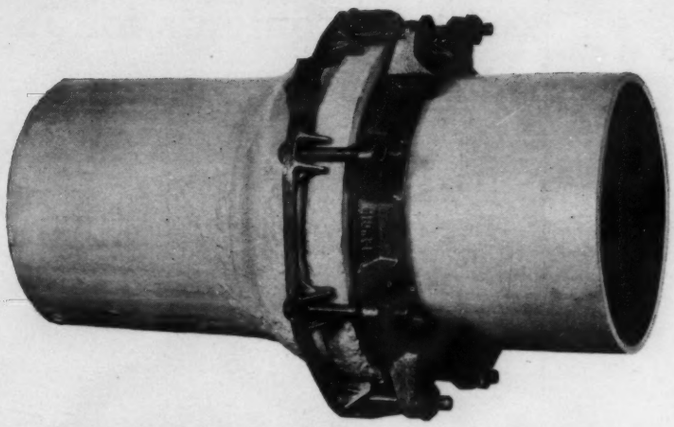
RESERVE SEALING POWER

How it protects your clamping dollar!

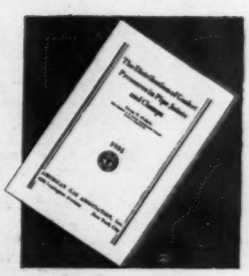


You wouldn't put up a building without making it far stronger than use will ever require.

Similarly with a bell-joint clamp on the performance of which *your whole clamping dollar depends* —you want it more than capable of meeting every service requirement.

One clamp on the market—Dresser Bell-joint Clamps, Style 60 —has that ability . . . has it because Dresser builds into it *Reserve Sealing Power* to meet both today's and tomorrow's conditions.

Send for booklet shown at right. It tells how Dresser, by means of an ingenious machine (the Sealometer) *scientifically* gives you pre-assurance of clamp tightness beyond what you'll ever need!



FREE! Send for booklet: "The Distribution of Gasket Pressures in Pipe Joints and Clamps."

RESERVE SEALING POWER . . . AND THESE EIGHT ADVANTAGES, TOO!

1. PERFECT ADJUSTABILITY

Follower ring has wide range of adjustment around spigot and an unbroken gasket recess.

Serrated ends on anchor-ring sections permit simple, effective adjustment around bell.

2. Quick and Easy Installation—without interrupting the service, using only a wrench.
3. High-Strength Malleable Iron—especially developed.
4. Balanced, Rugged Construction—providing ample strength at all points.
5. Complete Size Range—permitting standardization in all sizes.
6. Hundreds of Users—including 83% of the largest cities in America.
7. Built by Dresser—largest and oldest maker of bell-joint clamps.

8. CORRECT GASKET DESIGN

Large, specially compounded, condensate-proof gasket extends well up face of bell beyond calking and is confined so as to provide a pressure-tight seal, plus desirable flexibility in the joint. No protective parts are necessary.

DRESSER BELL-JOINT CLAMPS, Style 60

S. R. DRESSER MANUFACTURING COMPANY · BRADFORD, PA.

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CRAIG ESPY, Assistant Publisher — **ARTHUR ROHMAN, Managing Editor**

W. G. RUSSELL, Field Representative — **ANATOL FOMILYANT, News Editor**

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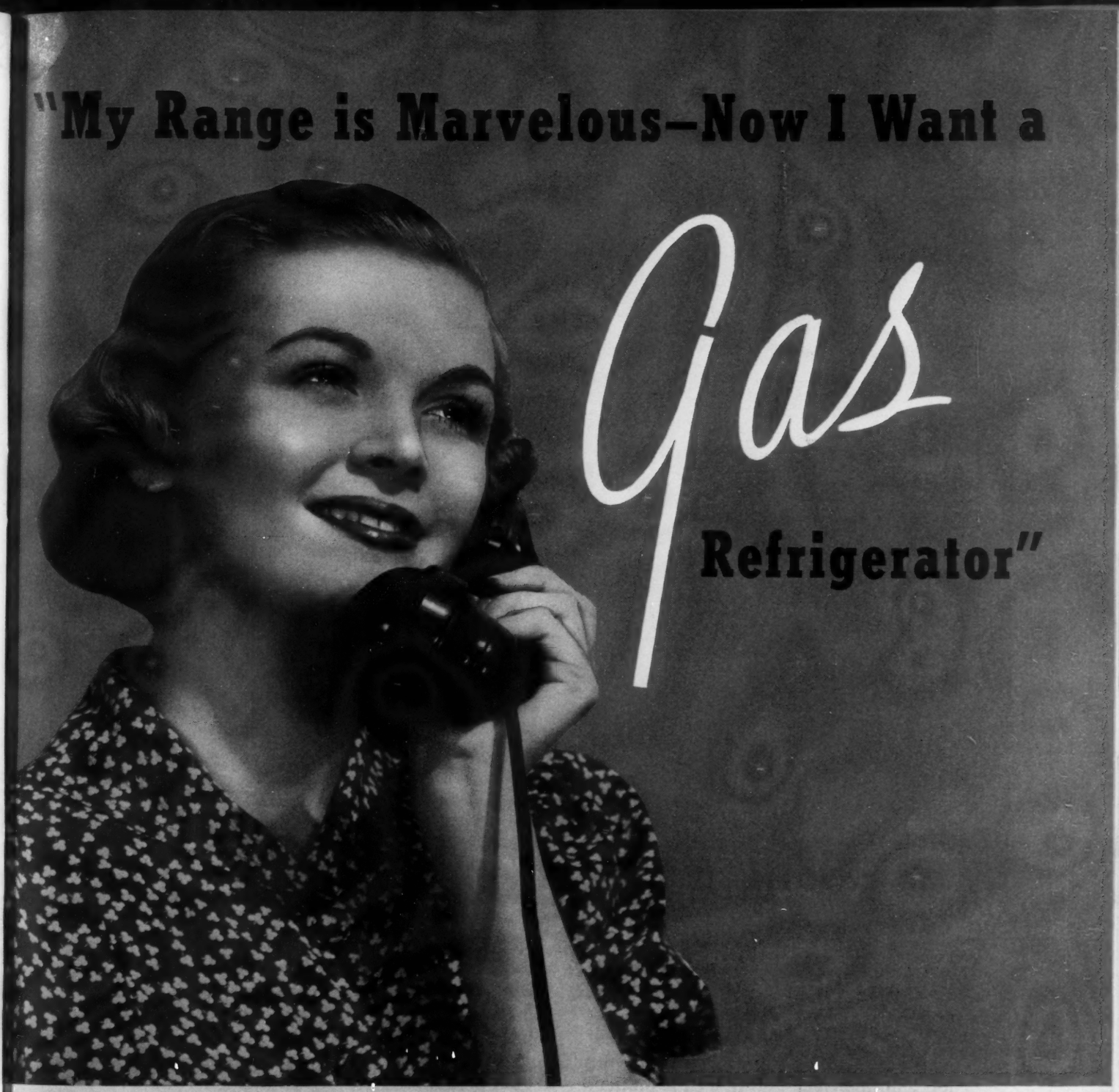


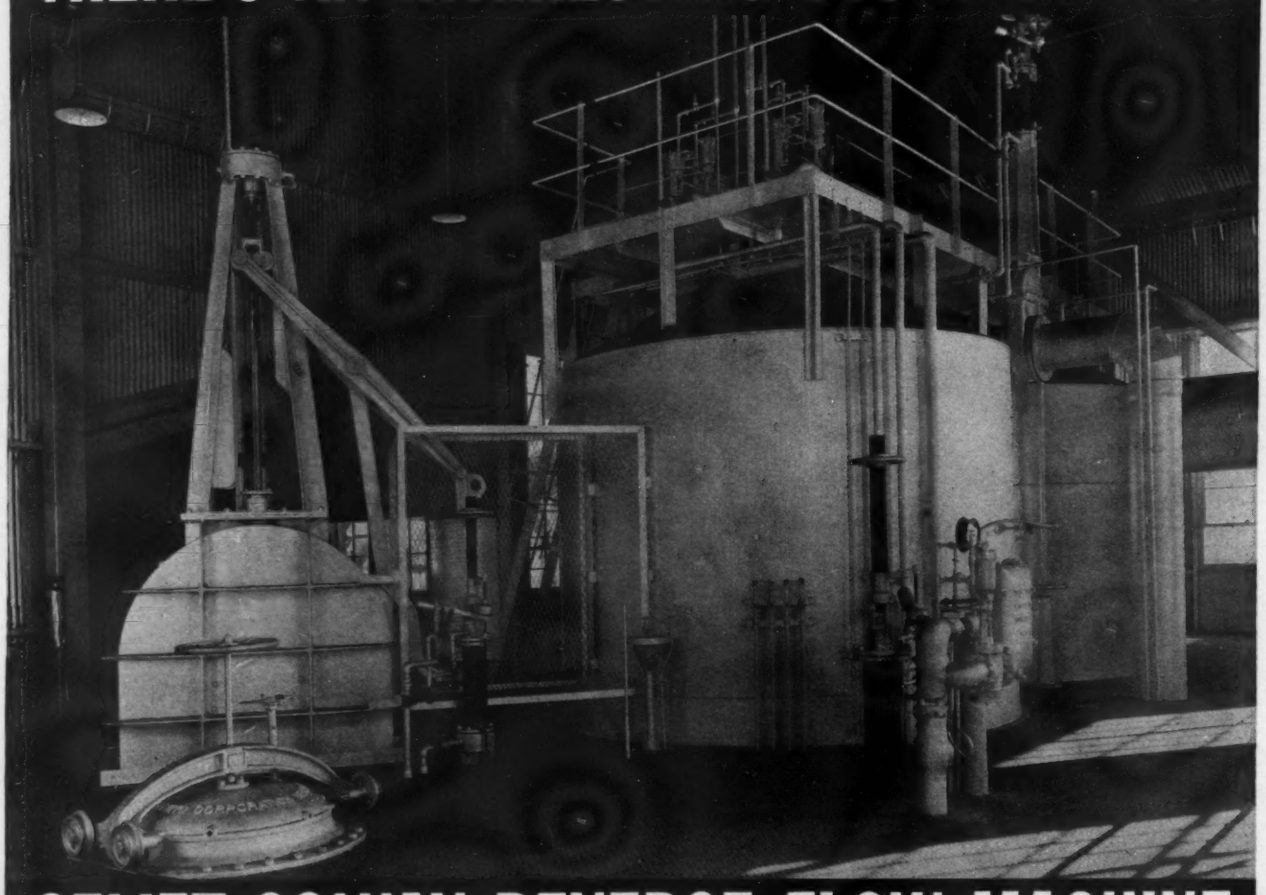
CLEAN GAS MAKES SATISFIED CUSTOMERS

Up go sales, down go service costs when GAS does its job silently, unfailingly. As engineers know, nothing but CLEAN Gas can do that. Especially with modern appliances, their smaller apertures and delicate mechanisms. So follow the lead of Operating Engineers from coast to coast. Take the step that banishes all chance of clogged burners due to fuel . . . equip your plant exclusively with Blaw-Knox Gas Cleaners. You'll find that "as Gas flows, demand grows".

BLAW-KNOX
GAS CLEANERS

BLAW-KNOX DIVISION OF BL... FARMERS BANK BLDG. PITTSBURGH ...

THERE'S AN INTERESTING STORY IN THIS



SEMET-SOLVAY REVERSE FLOW MACHINE

• • • • LET US TELL YOU about this Semet-Solvay Reverse Flow Water Gas Machine, one of the largest units of its kind ever built.

You will be interested to learn how it was designed for its particular and difficult job and how remarkably well it fulfills the demands made upon it. The operating results will surprise you. The excellent layout and construction will appeal to you.

The Semet-Solvay Reverse Flow Process is the most exciting development in water gas manufacture in many years. Adaptable to installed equipment, it will improve the performance of any standard machine.

Write for full information, if your water gas operations could benefit by modernization, replacement or addition of capacity. We will be pleased to prepare data and recommendations for an installation.

SEMET-SOLVAY
ENGINEERING CORPORATION

Engineers *Contractors*

40 RECTOR ST. NEW YORK, N. Y.

Authorities agree that an

ASBESTOS FELT WRAPPING *is needed for* LASTING PIPE PROTECTION

"The full effect of the waterproofing qualities of a bituminous material cannot be obtained in underground service unless some means is employed to reinforce it against distortion and abrasion. The use of tough fabric wrappings is a recognition of this requirement."

American Petroleum Institute

"All types of organic fabrics are rapidly destroyed by a great variety of bacteria and fungi, when exposed without protection to soil, air or sea water."

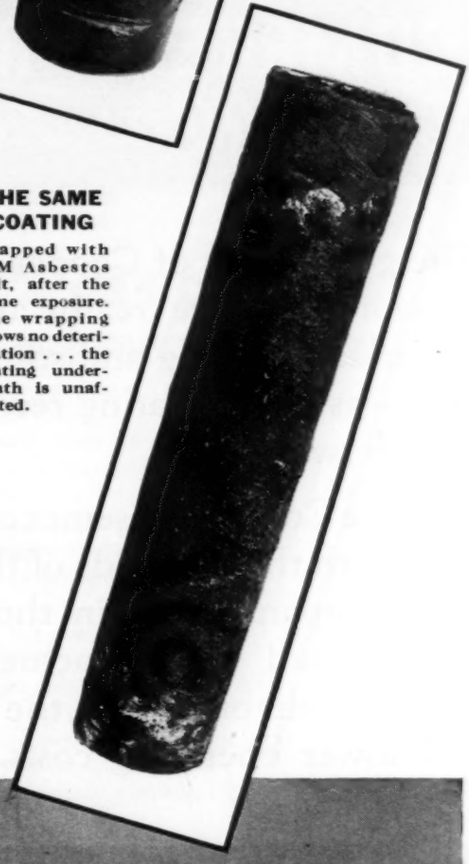
"The asbestos felts are practically unaffected by all conditions, although on several coatings they are exposed to the direct action of the soil."

". . . in all the above-described soils the best type of coating from the standpoint of protection is the asbestos (wrapped) reinforced coating."

American Gas Association

UNWRAPPED BITUMINOUS COATING

after exposure to clay soil. Note cracks and deterioration. Much of the protective value of the coating has been lost.



THE SAME COATING

wrapped with J-M Asbestos Felt, after the same exposure. The wrapping shows no deterioration . . . the coating underneath is unaffected.

FOR OVER 25 YEARS, Johns-Manville Asbestos Pipe-Line Felts have been used to provide tough, lasting protection for bituminous coatings on underground pipe. To date over 30,000 miles of pipe lines have been protected in this way! For complete information, write for Engineering Brochure D. S. 375. Johns-Manville, 22 E. 40th St., New York, N. Y.

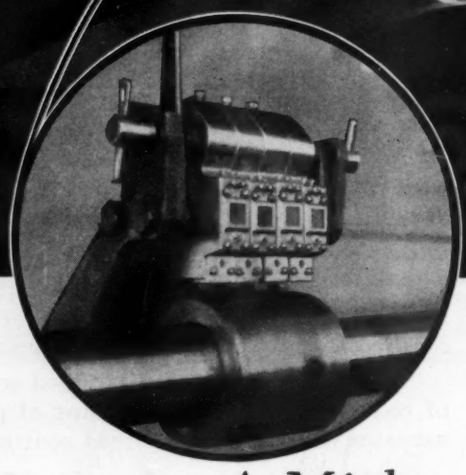
JOHNS-MANVILLE JM PRODUCTS

Johns-Manville

ASBESTOS PIPE-LINE FELTS

LIBERAL, KANSAS—Ten, Type-22, 1000-hp., twin compressor units in station of Panhandle Eastern Pipe Line Company.

COMPRESSOR UNITS— *as GOOD as they look!*



The good looks of Cooper-Bessemer compressor units are really an indication of better engineering and smoother performance—as the operating records of any user will show.

Because Cooper-Bessemer constantly keeps pace with the demands of the gas industry, this company leads in the refinement of every detail, in the achievement of still greater reliability, in the attainment of still lower operating costs.

- - - - - *A Mighty Important Detail!*

Ignition Interrupters—improved Cooper-Bessemer type, with short high-tension leads—insure simultaneous firing of both spark plugs in the same cylinder. Can be serviced or replaced without shutting down the engine! We could show you many other engineering refinements, but this one is typical.

THE COOPER-BESSEMER CORPORATION

640 EAST 61st STREET . . . LOS ANGELES, CALIFORNIA

25 West 43rd St., New York City Mills Bldg., Washington, D. C. 631 Spring St., Shreveport, La. 201 East 1st St., Tulsa, Oklahoma Magnolia Bldg., Dallas, Texas Esperson Bldg., Houston, Texas

Mount Vernon, Ohio — PLANTS — Grove City, Pennsylvania

THE *Greatest* DEVELOPMENT IN

GAS CONTROLS

SINCE THE CONCEPTION OF AUTOMATIC HEAT

WATCH FOR THE ANNOUNCEMENT NEXT MONTH OF THIS NEW *Automatic* CONTROL . . . YOU'LL RECOGNIZE ITS IMPORTANCE TO THE GAS INDUSTRY

BIGGEST GAS CONTROL NEWS IN TWENTY YEARS!

BIGGER THAN THE QUIET AC SOLENOID
(DEVELOPED BY GENERAL CONTROLS IN 1931)

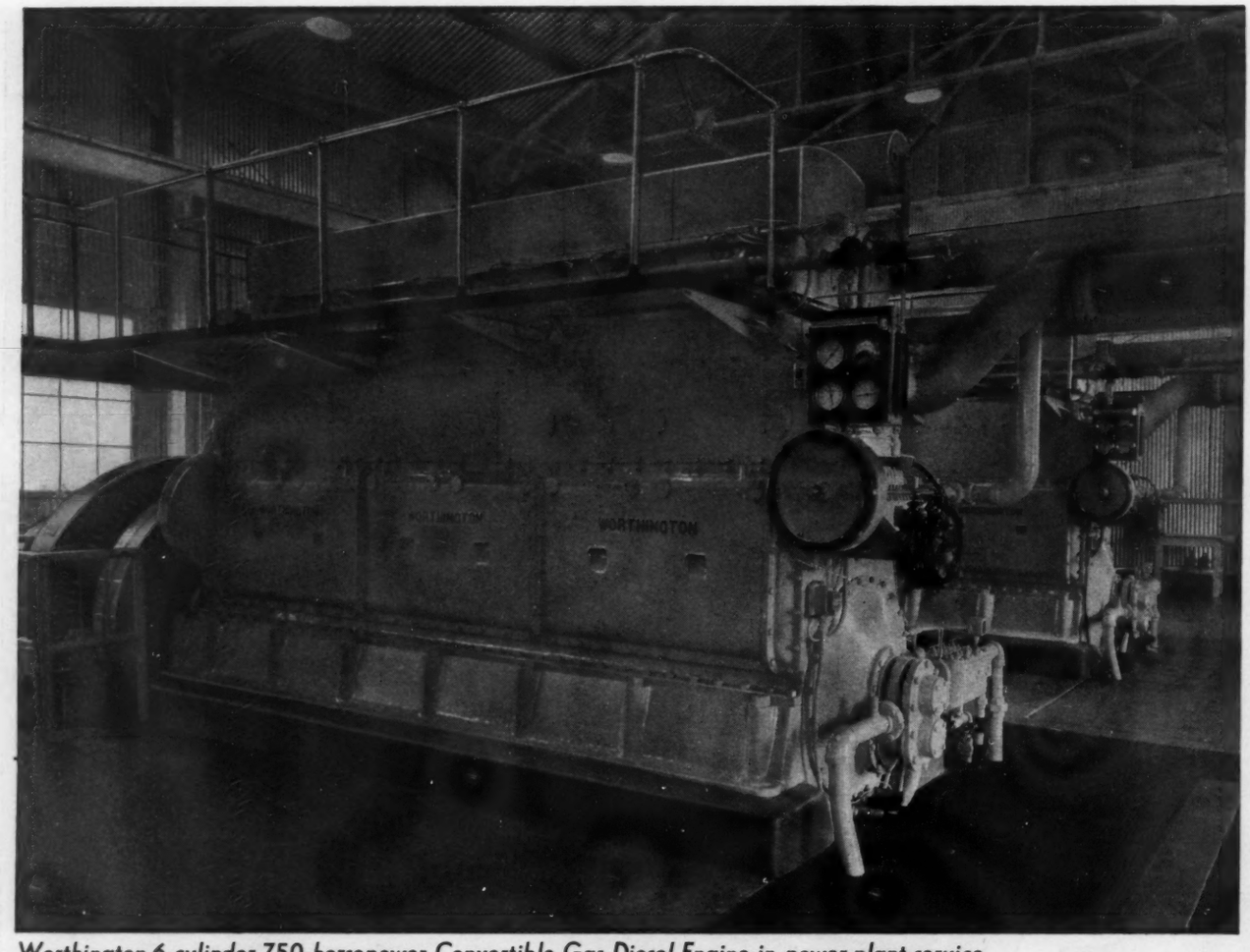
BIGGER THAN THE SLOW OPENING DIAPHRAGM VALVE
(DEVELOPED BY GENERAL CONTROLS IN 1934)

BIGGER THAN THE DUAL MAGNETIC GAS VALVE
(DEVELOPED BY GENERAL CONTROLS IN 1935)

BIGGER THAN THE METROTHERM THERMOSTAT WITH BIMETAL THERMOMETER
(DEVELOPED BY GENERAL CONTROLS IN 1937)

GENERAL CONTROLS

NEW YORK • CLEVELAND • CHICAGO HOUSTON • LOS ANGELES • SAN FRANCISCO



Worthington 6-cylinder 750-horsepower Convertible Gas-Diesel Engine in power plant service. This design is available in sizes of 375 to 1500 horsepower in 3 to 12 cylinder arrangements

WORTHINGTON CONVERTIBLE GAS-DIESEL ENGINES *offer to natural gas distributors an exceptional means to build... as well as level out... their gas power loads.*

Quick convertibility from gas to Diesel fuel protects plant investment... an all-important factor, not only for the distributor, but possibly a determining factor for the prospective gas power plant owner.

These units are built in sizes from 50 to 1500 horsepower. They are readily convertible in a few hours, by means of few parts... at low cost. They offer the advantage of the highest economy in fuel, either as gas or Diesel engines.

35 YEARS OF SUCCESSFUL ENGINE BUILDING AND APPLICATION EXPERIENCE

WORTHINGTON PUMP AND MACHINERY CORPORATION

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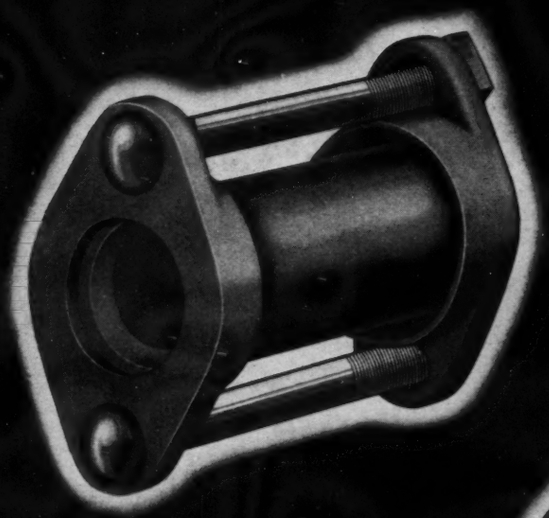
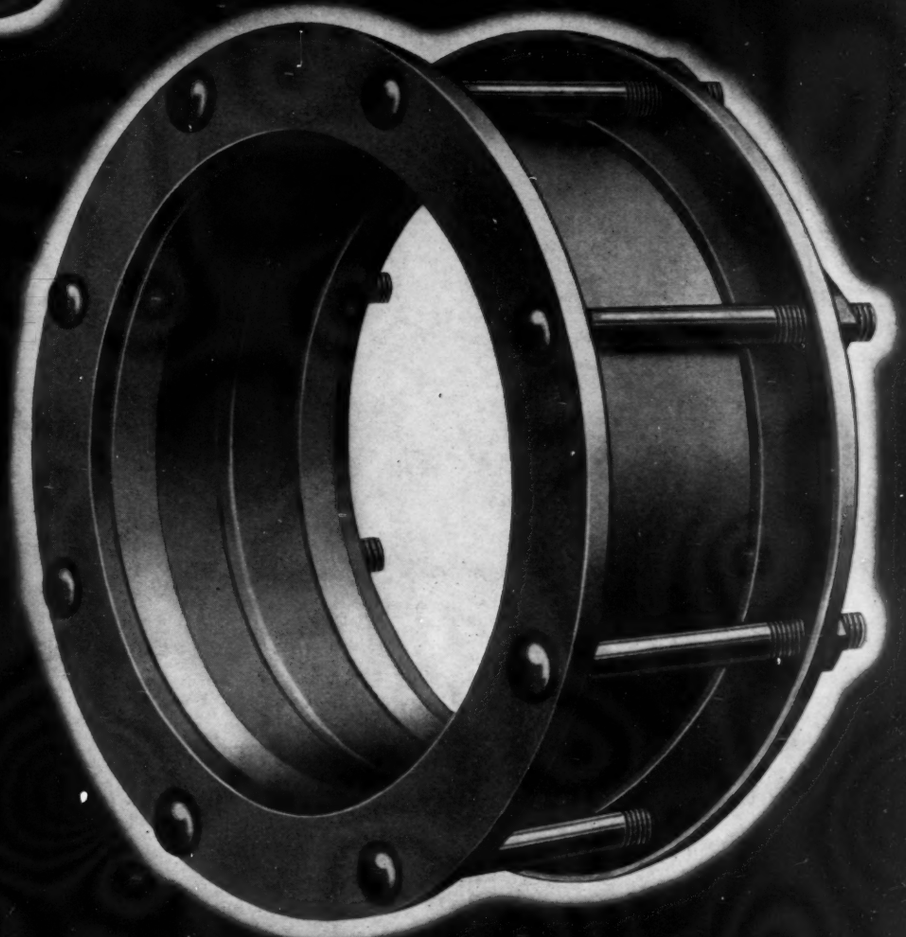
DEG-D

DAYTON....



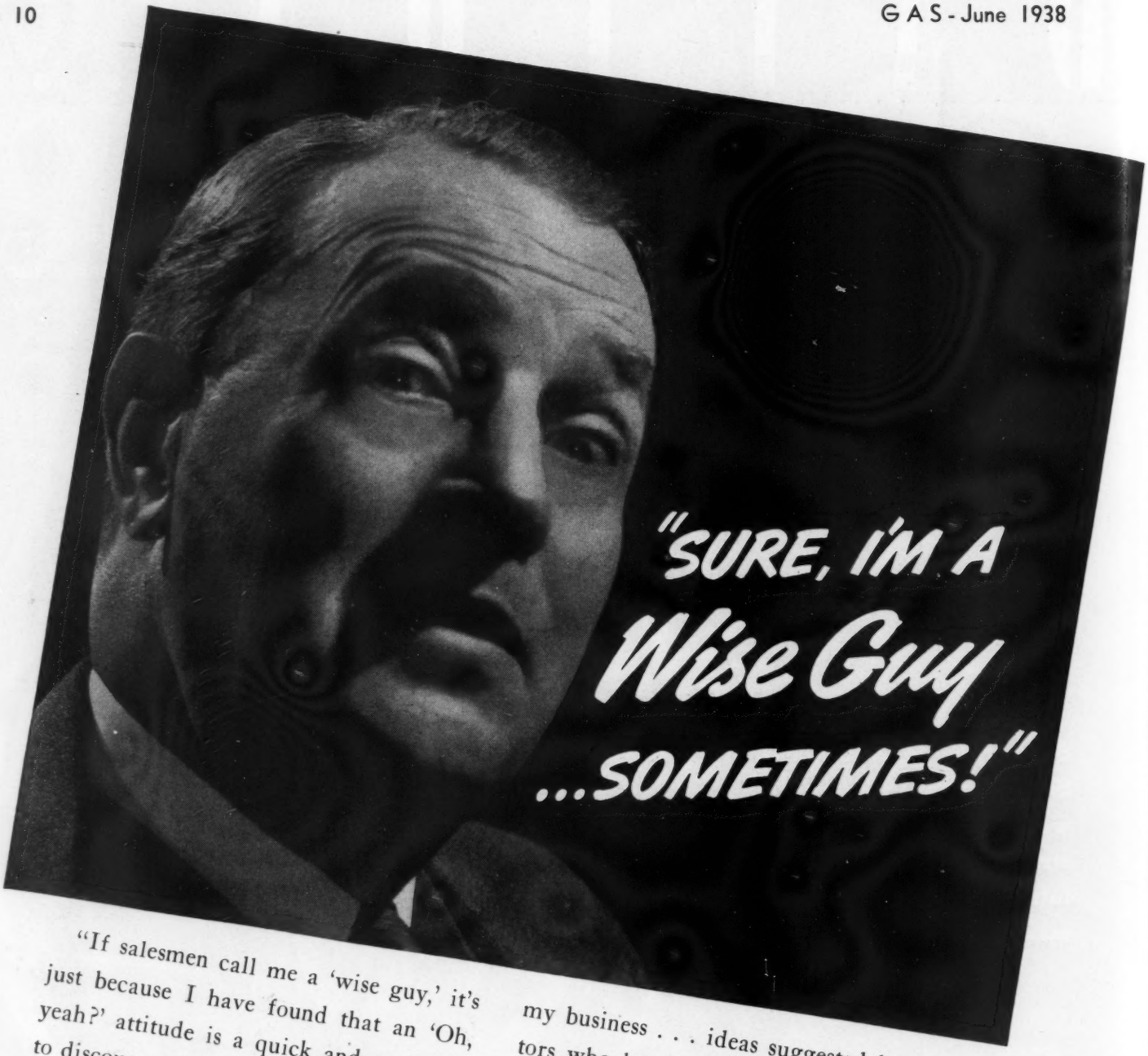
Sizes ½" to 2" I. D.—Malleable Flanges—Seamless Steel Centers—Incomparable for service lines.



Sizes 6⅝" to 24" O. D. Steel Flanges—Electrically welded Centers—Constructed in anticipation of future pipe line requirements.

..No. 1 COUPLINGS

THE NATIONAL SUPPLY COMPANY
(DAYTON COUPLING DIVISION)
TOLEDO, OHIO, U.S.A.

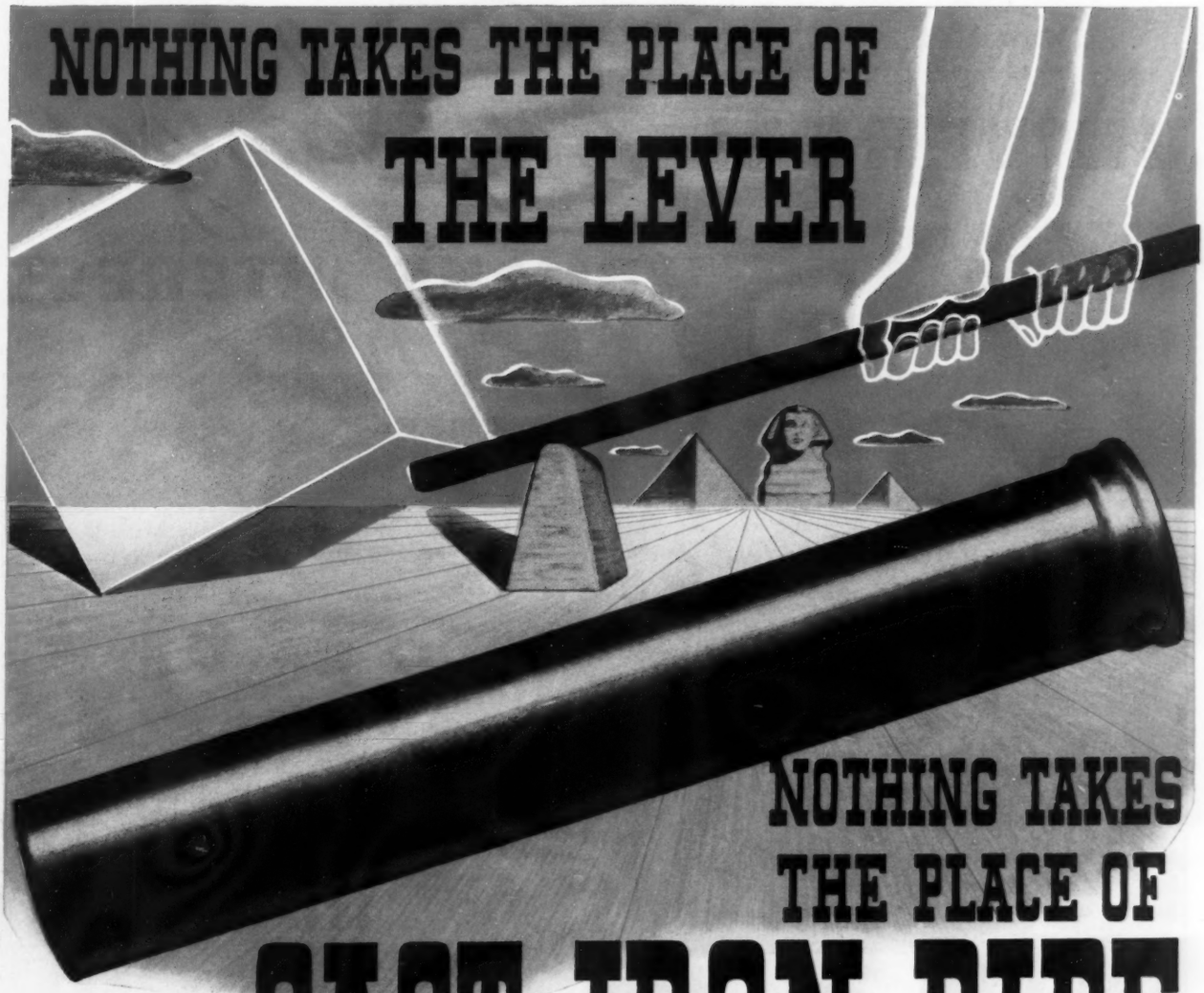


"If salesmen call me a 'wise guy,' it's just because I have found that an 'Oh, yeah?' attitude is a quick and easy way to discourage 'em. And I am too darned busy to spend all day arguing! Besides, I never like to make up my mind while the salesman is present.

"But there's one place where a sales approach *can* get in some good licks . . . right in the pages of *GAS*. For one thing, I remove that 'wise guy' mask when I pick up this paper, because here is where I get the progressive ideas about my business . . . ideas suggested by editors who know the natural gas business from alpha to izzard.

"I read the advertisements, too, because I know that any advertiser in a publication that belongs to The Associated Business Papers isn't getting editorial 'puffs,' so he must have something *real* to offer.

"*GAS* is worth its subscription price many times over because it serves as a business handbook *and* as a buying guide."



THE LEVER and fulcrum as an engineering principle—cast iron pipe as a long-lived material for underground mains—nothing has taken their place for centuries. Yet both have been highly developed in design and efficiency.

If you demand *proved* long life and low maintenance cost that result from effective resistance to corrosion—assured safety margins for impact, beam load and crushing stresses—and permanently tight joints—then you will agree that *nothing takes the place of cast iron pipe.* Some materials meet some of these requirements but only cast iron pipe meets them all.

CAST Q IRON

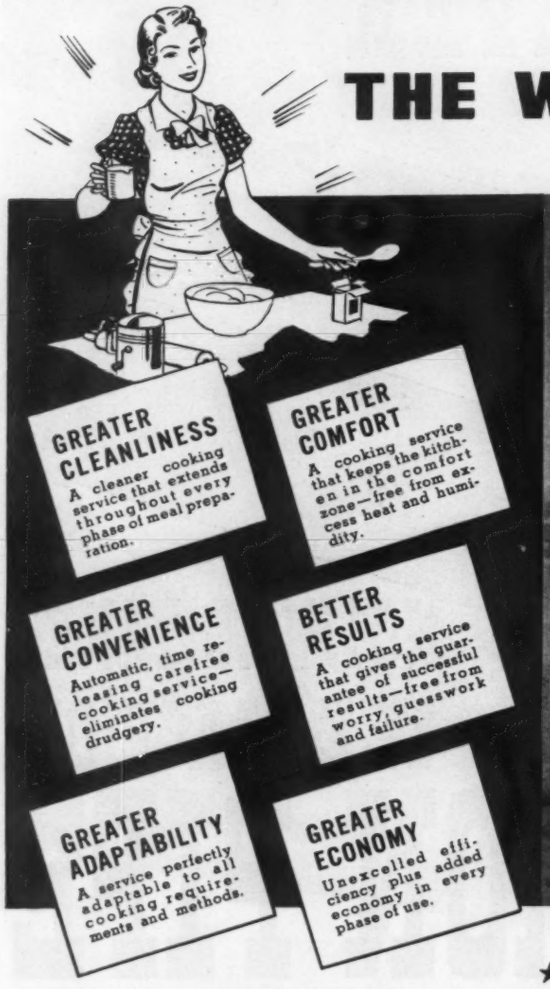
Look for the "Q-Check" registered trade mark.
Cast iron pipe is made in diameters from 1¼ to 84 inches

THE STANDARD MATERIAL FOR UNDERGROUND MAINS

Replacing another material which failed in 6 years, Port Arthur, Texas, installs a cast iron gas main equipped with bottle-tight mechanical joints. Cast iron gas mains, as old as the gas industry itself, are in service today.

THE CAST IRON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEARCH ENGINEER, 1013 PEOPLES GAS BUILDING, CHICAGO, ILLINOIS

UNIVERSAL *Emphasizes* THE WOMAN'S INTEREST


GREATER CLEANLINESS
A cleaner cooking service that extends throughout every phase of meal preparation.
GREATER COMFORT
A cooking service that keeps the kitchen in the comfort zone—free from excess heat and humidity.
GREATER CONVENIENCE
Automatic, time releasing carefree cooking service—eliminates cooking drudgery.
BETTER RESULTS
A cooking service that gives the guarantee of successful results—free from worry, guesswork and failure.
GREATER ADAPTABILITY
A service perfectly adaptable to all cooking requirements and methods.
GREATER ECONOMY
Unexcelled efficiency plus added economy in every phase of use.

The Universal Sales Promotional Program stresses those factors which are of the greatest interest to the Homemaker. It interprets the devices, as well as the range, in terms of benefits to the user, and deals specifically with those six points which have the greatest bearing on influencing the Homemaker in purchasing a new cooking appliance . . . greater cleanliness—greater comfort—better results—greater convenience—greater adaptability—greater economy.

★ The Universal Gas Range was engineered with one primary thought in mind—the elevation of gas service to its highest plane of convenience and modernity. With such a principle controlling basic design, it is a natural sequence that the Universal Gas Range not only promotes gas as the ideal cooking fuel, but also emphasizes to the greatest extent the woman's interest. Broiler, oven, top burners—whatever division of the range pressed into service—whatever the method of cookery involved, Universal not only gives the highest standard of performance, from the standpoint of efficient economical operation, but also assures the Homemaker of simplified, certain, time releasing cooking results.

UNIVERSAL GAS RANGES

CRIBBEN & SEXTON CO. • 700 NORTH SACRAMENTO BOULEVARD • CHICAGO

GAS
June, 1938

Guest Editorial

Industry Must Wage a War of Sales Aggression

By B. H. GARDNER
Director of Sales
Columbia Engineering Corporation

ALL business is today facing most serious problems, but it would appear that the gas business has more than its share. Not only do we have problems relating to increased taxes, increased labor costs and difficulty of raising new capital, which are common to all business, but in addition we have many problems that seem to be peculiar to the gas industry. In the first place, we have experienced a very serious loss of cooking load. This loss in cooking load is largely due to changed habits of living. The average person is eating less bread and less meat, and more fresh fruits and fresh vegetables. More products of the bakery and the canning factory are constantly being sold. More meals are eaten away from home. Each of these changes calls for the use of less gas. The cumulative total means a very large loss in residential sales.

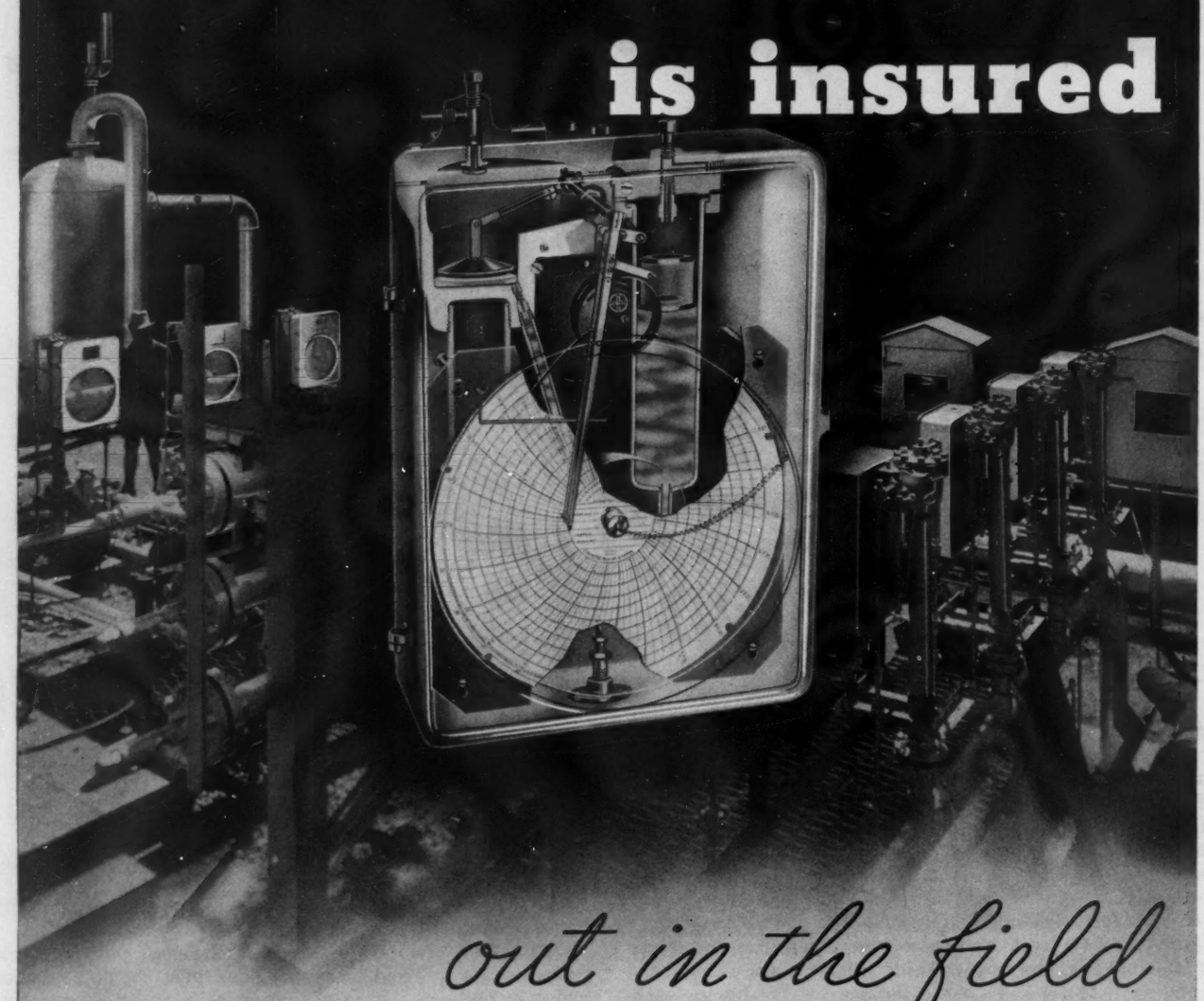
In addition to the serious loss in residential sales due to changed living habits, the gas industry now faces most aggressive electric range competition. To whatever extent this competition succeeds, to just that extent the cooking load of the gas industry will correspondingly decrease. In addition, the house heating load is also subject to increasingly severe competition from oil burners and coal stokers.

Facing these facts, the question at once arises as to what we are going to do about it. One thing seems certain and that is that any company that adopts the easy policy of merely drifting with the tide is certainly headed for still greater troubles. To get out of our difficulties calls for a resolute facing of conditions and for much hard work. We must develop and market new equipment, developing new uses for gas. The air-conditioning market offers great possibilities and it is hoped that suitable equipment will soon be available at prices that can reach the mass market. Some of us feel that there is a tremendous market for the sale of gas for spring and fall heating among the many customers that cannot afford complete year around heating. It is hoped that equipment to supply this market will soon be available.

This is a time when we must develop every possible new use for gas and these new uses must not be neglected merely because the consumption of a given unit seems small. When the gas refrigerator was first introduced many felt that it was not worthy of much promotional effort since the use per unit was so small. If there are any in the gas industry who still have this feeling, it might be well to remind them that approximately 1,300,000 of these refrigerators are now in daily operation, and assuming that approximately one-half are used in natural gas territory and one-half in manufactured gas territory, the total use of gas by all refrigerators is approximately twenty-one billion cubic feet per year. This is a tremendous gas load and it is constantly increasing.

The only way our gas industry will get out of its present troubles is to sell its way out. Selling is undoubtedly harder today than it was a year ago, but sales are actually being made to customers who can buy. Present conditions call for more selective selling, but there are customers who have the means to buy the things they want. Our job is to make them want things that use gas. This is a time for a more intensive sales effort, a time for analyzing our present methods and studying possibilities for improvement; a time to make sure that every means is adopted to obtain the widest possible use of all types of approved gas appliances.

Where accuracy is insured



out in the field

All of the many significant Westcott refinements in construction have a single purpose . . . a PRACTICAL meter that will HOLD its fine in-built sensitiveness and accuracy—no matter how rigorous the conditions of service, whether for Indicating, Recording or Integrating instruments. ● Accuracy must be BUILT INTO a meter. In the Westcott orifice meter, it is embodied in a score of outstanding features: The precision machining of the differential gage body chambers . . . the low angle of travel of the float . . . the small angular travel of the static pressure tube . . . only one movable part between the mercury surface and the chart record . . . ● Printed or personal engineering information is available on request. Specifications on the popular new Round Case Indicating Flowmeter also may interest you.

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AMERICAN METER CO. MEASUREMENT ENGINEERS

AMERICAN METER COMPANY
INCORPORATED
Measurement and control of Gas, Oil, Steam, Air and Liquids
PACIFIC METER WORKS • LOS ANGELES • SAN FRANCISCO

GAS

FOURTEENTH YEAR OF PUBLICATION

Thermally Thinking

By Stanley Jenks

Editor

New Orleans The New Orleans convention has gone, but its memories and accomplishments linger on. It was a great convention throughout, and to those who were responsible for its organization, and to those on the program who made it a gold mine of information and inspiration, congratulations and thanks. After New Orleans, it can be said in all sincerity, that the Natural Gas department of the A.G.A. has little to learn when it comes to staging a worthwhile convention.

"Our job is a selling job" was the slogan of the convention and Bob Hendee in his address at the opening session, in stating that it embodied the entire future of the gas industry said, shall we say, a "mouthful." For, whether the topic was conservation, transmission, accountancy or any other operating phase, behind it was the underlying thought that our ultimate job is inevitably a selling job. Mounting taxes, threatening further federal regulation, increased operating expenses, are but challenges to a virile industry like ours, to take off our coats, and with order books under our arms, get out on the firing line and sell a better fuel as it has never been sold before.

To those who worry unduly about the sources of supply, N. C. McGowen, president of the A.G.A., and a natural gas man to boot, had a word of comfort and encouragement. Known reserves insure us at least 28 more years of existence. New wells are being discovered daily and these, plus existing reserves and better methods of conservation indicate that all who read this need have little anxiety during their lifetime regarding the adequacy of the available natural gas supply.

The rapid growth of the so-called "Bottled," or as it prefers to be called, liquefied petroleum gas industry, received the recognition it deserves. It is to be hoped, to echo one of the speakers, that the gas industry will recognize its potentialities before it passes into other and less able hands.

Accordingly, we welcome R. M. Conner's announcement that specifications for butane to supplement the existing minimum requirements on propane are being prepared.

So in bidding New Orleans "adieu," we greet Tulsa, 1939 convention city, and may the interim show that our job has been a bang-up selling job.

The C. P. Range A young gas utility friend of mine, who still takes his gas engineering degree pretty seriously, is closely following every move in the development, evolution, and future of the C. P. Range. Like most of us, he recognizes the C. P. Range as a distinct step forward in domestic gas utilization technique, and is well aware of the opportunity it presents to the gas industry to widen still further the gap of superiority existing between gas and other fuels.

"If the gas utilities muff this opportunity, and don't put everything they've got behind the C. P. Range," sez he. "Well! Thank God I'll be finding it out before I'm thirty, and before it's not too late to get into another industry."

Of course, I think my young friend will still be a gas man, when I am rapping at the gates in Washington for my old age pension, because early indications throughout the country show an enthusiastic interest, which is growing daily.

By August 1, when the C. P. Range makes its official bow, our sales boys will be "over the top" in the biggest concerted offensive ever launched by the gas industry to capture and consolidate the all-important domestic cooking load. Incidentally, the August issue of GAS will feature discussions of the C. P. Range.

Superseded? No! The need for aggressive sales action all along the line, which our guest editor, Mr. B. H. Gardner, calls for so forthrightly on the preceding page, is too logical to be challenged.

There are many forces at work to undermine the gas industry and they come from many unsuspected angles. A particularly interesting one has been called to our attention by Clyde H. Potter, commercial manager, Southern Counties Gas Company of California, Los Angeles. Mr. Potter's alert eye caught something that most of us would undoubtedly have overlooked. It is the definition of the word "supersede" as given in the 1937 edition of Webster's Collegiate Dictionary, published by G. & C. Merriam Co., Springfield, Mass. According to this alleged aid to adolescent education, the jig is up, you can all go home boys and girls, the gas in-

dustry is now history and presumably, we gas men belong with the hansom cab drivers and candlestick makers. R.I.P. But in Mr. Potter, this very-much-alive-and-kicking gas industry found a worthy champion, as witness his letter to the publishers of the dictionary:

G. & C. Merriam Co.
Publishers
Springfield, Mass.

Gentlemen:

We would like to call your attention to what we consider an incorrect statement in Webster's collegiate dictionary, fifth edition, issued in 1937, in your definition of the word, "supersede." We quote from your description as follows: "1. To cause to be set aside; to force out of use as inferior; as, electricity has superseded gas."

In your 1930 edition the following definition was used,—"3. To make void, useless, or unnecessary, as by coming in the place of; set aside; as, electricity has largely superseded gas."

The inference we get from these two definitions would indicate that gas was largely being superseded by electricity in 1930, but by 1937 had been completely eclipsed by this latter fuel.

I would like to call your attention to the fact that gas is not being replaced by electricity; on the contrary it has shown steady and consistent gains throughout the entire industry since its inception more than a century and a quarter ago. It might surprise you to learn that the investment in the gas industry exceeded by many millions the amount of capital employed in the steel industry, the latter showing an investment of $4,200,000,000 whereas the investment of the gas industry approximates $5,000,000,000.

More than 135,000 people are employed in the manufactured and natural gas industry with an annual payroll of $213,000,000. It is an established fact that the average worker in the gas industry has behind him the tremendous investment of nearly $37,000 whereas in the railroad business the investment per employee is only $25,000 and in the steel industry $7,000 per employee. In the automobile industry the investment per employee is approximately $3,000. These figures give you an idea of the tremendous investment and background behind the gas industry, which according to your definition is being crowded out of the picture.

I quote from a radio program given on February 5th, last, by the Department of Commerce under the caption—"Stories of American Industry," in which the following statement was made: "Although the present era has often been called the age of electricity, nine times as much energy is produced in the United States each year by gas as is produced by electric power."

During the year 1936, 1,460,000 gas ranges were sold to the American public and our estimates for the year 1937 approximate 1,600,000 gas range sales. The total for 1936 is equal to the entire number of electric ranges being used throughout the United States at the present time. It hardly seems logical to state that electricity is replacing gas in the face of these figures.

. . . . . .

Gas heating and gas water heating are predominant in many sections of the nation, especially in those territories served by natural gas. It is hardly necessary to mention that American industry today would be halted if it were not for gas service which meets every requirement desired in that field.

. . . . . .

Incidentally, I observe that Funk & Wagnall's define supersede as follows:—"1. To take place of; replace; supplant. 2. To put something in the place of; set aside; suspend; annul." There is no reference made here to the effect that one industry is superseding another.

In view of these circumstances, I certainly feel that consideration should be given by your editors in changing the definition of "Supersede" in your next edition.

Yours very truly,
CLYDE H. POTTER
Commercial Manager.

Maybe we should do some "superseding" ourselves in our own bookcases.

Summer-Winter Hook-Up

In my morning's newspaper, there is an advertisement of an oil burner manufacturer in which he claims (1) to furnish hot water the year 'round at practically no additional fuel cost (2) to add to the beauty and roominess of the basement by combining the water heater and the central heater in one compact cabinet and thereby eliminate a "separate special water heater" and (3) to save the customer the bother of a split fuel bill.

On my desk as I write, there is a folder from an oil boiler manufacturer, who, explaining the merits of a built-on water heater unit, states ". . . . . in winter, your hot water will cost you practically nothing; in summer you'll save money, for hot water is furnished by the —— boiler at little cost in fuel." (Must get our college dictionary friends to define "practically" for us.)

In Hartford, Conn., according to a reliable informant, in new home construction last year, 46.0 per cent of the houses built went to a summer-winter oil hook-up, compared with 23.0 per cent to gas for water heating. And nobody can accuse Howard Carlson and his Hartford Gas Co. sales gang of being asleep at the switch.

To face facts, this is a serious situation, especially in the manufactured gas areas. We all know this "practically no extra cost" business is a lot of horse feathers. The M.I.T. tests with which every gas utilization man is undoubtedly familiar, exposed beyond a shadow of a doubt, the appalling inefficiency of heat exchangers. B.t.u's to heat water, no matter from what fuel they come, cost money, and you can't use them twice, as the public is apparently being kidded into believing. The public is either being hornswoggled or we are being outsold by an inferior fuel.

An Epic Sales Job

My friends know me as a strictly non-technical engineer, and as such, I am neither competent nor desirous to get into any controversies over the respective claims for underground and above ground distribution systems for liquefied petroleum gas. However, having kicked around in the sales end of the gas industry for many years, I feel that I know a good sales and load-building job when I see one. And that is just about how I see the growth of the Atlantic States Gas Co., whose methods of operation and sales results in the liquefied petroleum gas field are described in this issue. (Page 56.)

A record of 9,000 connected customers in rural Pennsylvania and New York, with average annual sales of better than 200 gals. per customer, and with retail gas appliance sales totalling almost one million dollars, all within 15 months, is a sales and load-building job that cannot be sneezed at.

To me, the story establishes two things. The growth of total liquefied petroleum gas sales from 222,641 gals. in 1922 to an estimated 130,000,000 in 1937, marks the definite birth of an important branch of the gas industry. My second conclusion is that Hall M. Henry in his "4-R" program could not find a better example to illustrate his contention that there is a definite ratio of man-power to appliances sold. Two hundred salesmen, roaming the highways and byways of the territory served by this company, did an epic job of rural "gasification."

Some Facts and Figures on Selling Gas Service

By O. R. DOERR

Pacific Gas and Electric Company

PRESENTED ON these pages is the major portion of a paper, "What a Salesman Should Know," which was offered by Mr. Doerr before the Spring Sales Conference of the Pacific Coast Gas Association in Los Angeles, March 24, 1938.—Editor.

SALESMANSHIP of the high-pressure variety has recently been flouted in the halls of our national government as one of the evil practices of modern business, being cited as the reason for cycles of overproduction and consequent recessions in production. The indictment in itself is somewhat contradictory for if salesmanship is the tool of business which causes overproduction, it is conceivable that it might also be the vehicle by which business can eliminate the reverse of this situation.

It seems that there is great misuse and misunderstanding of the term, "high-pressure." High-pressure selling for the most part was tabooed by our industry many years ago! Pressure selling or creative selling is not to be confused with the term. The latter refers to that legitimate, ethical procedure where the salesman takes the initiative in bringing his product to the customer and in leading and guiding that customer in his decision to purchase.

When business, under our capitalistic system, abandons the principle of aggressive salesmanship, it is sounding the death knell of mass-production and aiding and abetting a new economy.

The very objective of the present Administration hinges on the effectiveness of salesmanship. If the national annual income is to be pushed up to the 100 billion dollar goal sought, the machinery for arousing more wants in more people and the tempo of supplying those wants must be speeded up. That is nothing if not "pressure" selling.

There are at the present time employed by Pacific Coast Gas utilities approximately 7500 retail and perhaps 1000 wholesale salesmen. In just eight working hours, this small army of gas appliance salesmen will talk to not less than 50,000 customers and prospective customers, trying to sell them our products and earn an honest dollar for themselves.

What sort of a sales message are these men and women delivering? Are they telling the kind of sales story that should be told? Are they making the kind of sales presentation that measures up to the large investment in dollars in the gas business, to the hundreds of dollars spent in advertising and promotion which is done only for the purpose of making it possible for them to talk to more people and to tell that story more effectively?

The Sales Presentation

The sales presentation is the keystone on which rests the entire arch of business structure. Fit that keystone loosely into the structure and everything else is weak and flimsy.

This is particularly true with respect to gas appliances. They represent items requiring expenditures above the average and are purchased for use over a long period of time. In many instances, these appliance needs represent the only one of that character a prospect may have for the balance of a lifetime.

This situation is the more serious when it is recalled that approximately 85 per cent of all families earn incomes of $2000 per year or less. This income leaves only a slim margin per year for purchases of devices such as we sell.

Figs. 1 to 5 inclusive, compiled from the findings of the Brookings Institute, indicate how the average family expenditures are divided. While the findings consider annual income groups from under $1000.00 to over $5000.00, it must be remembered that four out of five families (86.1 per cent) have incomes of $2000.00 or less. A breakdown of monthly home expenditures and savings for these lower income groups is tabulated in the following column.

$1000 to $2000 Bracket		*Less than $1000 Bracket*
$35.00	Rent, fuel, light, furniture, appliances, dishes, towels, etc.	$21.00
$25.00	Rent	$15.00
$ 6.00	Fuel	$ 4.00
$ 1.00	Light	$ 1.00
$ 1.00	Supplies	$ 1.00
$ 2.00	Furniture & Appliances	——
$ 5.00	Approximate Savings	——

It is apparent from Figs. 1 to 5 that but a very few dollars per month can be spent by this mass low-income market for home furnishings and appliances. It is equally clear that our real competition is not within our own industry or with those promoting similar products utilizing competitive fuels but with the automobile companies, the concerns who sell gasoline, cosmetics, entertainment, etc. We are fortunate, however, in that many of our products result in use-savings of sufficient size that they can be justified economically even by the low-income customer.

Nevertheless, it is apparent from the chart that the typical prospect for gas appliances might be expected to shop with greater care and require more definite conviction than would be the case where other less valuable purchases are involved. When a business is confronted with these "now or never" selling opportunities, it isn't enough to have just *average* salesmen. They should be better than average.

Apparently the same crimes of commission and omission are daily being

perpetrated in our industry as well as elsewhere. Some recent surveys indicate what these errors are:

1. Failure to uncover and sell the need.
2. Failure to appeal to dominant buying motives.
3. Failure to sell through the several senses.
4. Failure to make ethical comparisons.
5. Failure to prove major claims.
6. Failure to secure agreement on buying decision.
7. Ineffective expression and delivery.
8. Incorrect progressive thought movement.

This does not mean that we should give moral support to a tirade against the mediocrity of salesmen. If salesmen are somewhat at fault, employers of salesmen and directors of sales activities are more at fault.

A picture of what the salesman himself thinks of his selling equipment, is offered in surveys made in two cities of 600,000 and 450,000 population. This research gives, in the order of their importance, the several phases of selling about which the salesman expressed a desire for more information. The tabulation of this survey follows:

Sales Training Interests of Salesmen

	Per Cent
1. How to make a better sales approach	74
2. How to close sales	72½
3. How to answer objections	67½
4. How to meet competition	62½
5. How to improve personal selling qualities	59
6. How to justify the purchase	52½
7. How to classify prospects	52½
8. How to find prospects	51½
9. How to do comparative selling	51½
10. How to improve demonstration	51½
11. How to apply the selling process	47½
12. How to make a better sales presentation	46½
13. How to uncover prospect needs	41½
14. How to prove selling statements	40
15. How to discover product selling points	37½

These answers do not indicate self-satisfaction on the part of the salesman as to his selling ability.

Now let's turn the spotlight for a moment on sales management. I believe that if those directly in charge of sales activities gave as much time and attention to the actual sales work of the business—getters in their organization—as they do to their incidental responsibilities such as answering letters, buying merchandise, organizing campaigns, etc., we would have fewer ineffective salesmen. This would be true if they gave this attention to the minute details of selling—to what the salesman says at each stage of an interview, to what he does, how he looks, which and how many of the controlling sales factors he uses, etc.

FIG. 1. Average family expenditures, incomes over $5000.

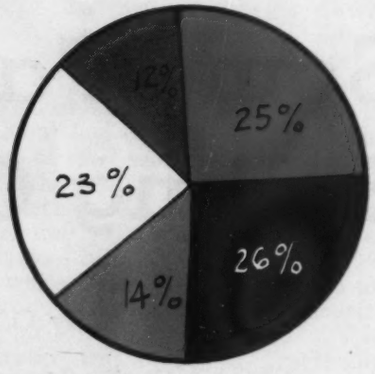


FIG. 2. Average family expenditures, incomes $3000 to $5000.

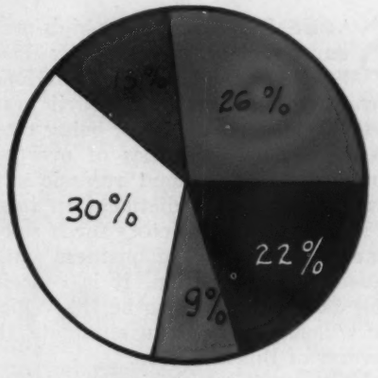


FIG. 3. Average family expenditures, incomes $2000 to $3000.

Production management, through scientific time and motion studies, has doubled production efficiency in the last 25 years. This same record can not be claimed for sales management. A review of the facts will show little or no gain in average dollar sales volume per salesman since the days of John H. Patterson when modern salesmanship was born.

Why isn't more being done about it?

There are many reasons. It isn't the simplest job in the world and most sales managers, at some time or other, are in a quandary as to what to do in the way of training salesmen. Sales training is one of the most perplexing functions of sales management.

From a survey in the same two cities as referred to above, information was secured from merchants as to their most difficult sales problems. More than half of them (51½ per cent) indicated this was hiring and training salesmen. All of the other problems combined did not appear as formidable as these. Price competition was considered by 29 per cent as the second most difficult problem, while all other difficulties totaled 19½ per cent.

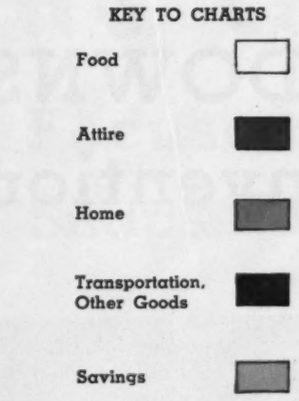
This general attitude was further confirmed by answers from these merchants as to the merchandising essentials upon which they desired help. The survey covered a gamut of items but topping the list were again sales problems such as training, hiring and equipping salesmen. Following are the details of this survey:

Merchandising Essentials Upon Which Merchants Desired Help

	Per Cent
1. Training salesmen	71
2. Equipping salesmen	62
3. Window displays	62
4. Hiring salesmen	59½
5. Traffic-pulling stunts	58½
6. Trade-in allowances	55½
7. Floor displays	47
8. Outside selling	44
9. Sales meeting procedure	39½
10. Incentive contests for salesmen	39
11. Demonstration plans	29½
12. Selling up	29½
13. Advertising procedure	29
14. Stock control	21½
15. Use of promotional material	19
16. Consumer-finance plans	19
17. Group selling	16
18. Departmentalization and store planning	16
19. Publicity procedure	13½
20. All-product representation	13½

As we further consider sales training, let us pause for a moment to recall some generalities about training.

Most people are inclined to believe that they learn readily whereas, as a matter of fact, they assimilate information poorly and slowly. An idea has to be "banged" at them incessantly if it is to become an accepted part of conscious thinking. Added to this, is



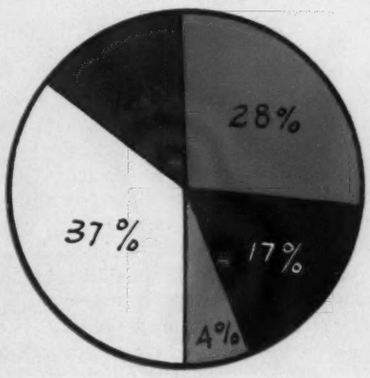


FIG. 4. Average family expenditures, incomes $1000 to $2000.

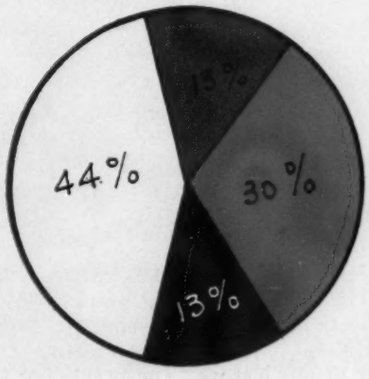


FIG. 5 Average family expenditures, incomes less than $1000.

the fact that the powers of forgetting function much more efficiently than those of remembering.

Basically there are three classifications of learning: (1) acquisition of knowledge, (2) acquisition of skill, and (3) acquisition of conduct.

Learning salesmanship involves all three of the above classifications, the latter one of which you can well appreciate might involve an entire lifetime of effort and study.

Learning how to be a good salesman involves a great deal more than just acquiring the knowledge to be found in a textbook such as is the case in the study of history or mathematics. Consequently, when some of our organized schemes of education fall flat, we become discouraged. We should approach the subject with an outlook beyond the immediate present. Salesmanship is something which should be studied continuously and the basic principles reviewed often.

A sale involves four major factors: (1) the prospect, (2) the salesman, (3) the product, and (4) the sale.

Insofar as the prospect is concerned, there is little the selling end of the business can do about him except to understand thoroughly his mental processes and how, in a sales encounter, to bring certain reactions into play. This involves, of course, knowledge of human nature, a knowledge of the operation of the fountain of human actions and reactions and the ability to interpret those processes as they develop. Successful selling depends on the effective use and understanding of this process of human motivation. Moreover, it appertains to a continuously changing set of circumstances as the variations in each individual bear on a sale. It means dealing with the Law of Exceptions as well as the Law of Averages.

The second factor, the salesman, emphasizes the need for that classification of learning identified as "Acquisition of Conduct." For example, a salesman should have or should acquire a pleasing personality. To achieve this might require years of effort. Tact and diplomacy are other attributes of a successful salesman. Such qualities cannot be acquired in a day.

My recommendation to the average business man is to avoid insofar as possible the necessity for building over personal qualities in salesmen. Most authorities now agree that people can change and improve their personalities; however, heredity and environment are such potent factors that if a salesman or prospective salesman has decidedly negative personal qualities, it might be far better to advise him to do work other than selling rather than to undertake the transformation of these negative qualities. Of course, the exceptional man, who will make the sacrifices to re-shape his personality, disproves the rule.

There are a number of methods of appraising an applicant in an attempt to determine, in advance, his ability along selling lines. Yet, all too many times even after the most careful analysis, the executive's judgment has proved wrong.

The importance of selecting salesmen with at least passing qualities is emphasized when we recognize that it costs from $75.00 up merely to get a salesman performing and much more to train him adequately. This investment is lost if the new salesman does not produce quickly or gives up at the end of his initial training period.

Generally, the business man who has inquired into the following few attributes of the prospective salesman has been about as correct as the executive who has thoroughly psychoanalyzed his applicant:

1. Is his appearance neat and appealing?
2. How is his health?
3. Is he interested in people?
4. Can he smile?
5. Is he intelligent?
6. Is he aggressive and enthusiastic?
7. Can he sell?

To find the answers to these questions might appear difficult; as a matter of fact, most of them can be readily answered.

You can render judgment as to a man's appearance and a doctor's examination will reveal his physical condition. Point No. 3, his affinity for people, presents more difficulty, but even here opportunities may come up in the interview to guide you. Perhaps you can observe how he reacts to people who may enter the office or how he responds to the presence of those nearby. In any event, you can inquire concerning his hobbies and how he spends his evenings. Not all the men who enjoy a round of poker with the boys or a game of pool on the corner are sales material but those are some of the characteristics of an extrovert.

Certainly you can satisfy yourself if he possesses the ability to smile, noting whether the smile is spontaneous or forced.

As to a prospect's intelligence, any one who has successfully earned his certificate from a public high school can usually be accepted as having sufficient intelligence for the average sales job. Too many times college degrees are not prescriptions for successful salesmen.

On the point of aggressiveness and enthusiasm, much depends. A man who is willing to work, to keep persistently at it and who can enthusiastically present your products to your customers is the sort of salesman who will win against many odds.

Wrapped up in the last pre-requisite is a large order. One might believe

(Continued on Page 64)

HIGHLIGHTS and LOWDOWNS on the New Orleans Convention

By STANLEY JENKS

THERE were 731 registered delegates and 212 accompanying ladies at the annual convention of the Natural Gas Department, American Gas Association, at New Orleans, May 9-12.

• • •

ROBERT W. HENDEE, chairman, Natural Gas Department, Colorado Springs: "Our convention slogan 'Our job is a selling job,' embodies the entire future of the gas industry."

• • •

The traditional hospitality and cordiality of New Orleans was well expressed in the welcome extended the convention by Commissioner Jess S. Cave on behalf of Governor Richard W. Leche, and Utilities Commissioner Fred A. Earhart, representing Mayor Robert S. Maestri.

• • •

N. C. McGOWEN, president, A.G.A., Shreveport, La.: "I want to impress on every production, transmission and distribution man the fact that fundamentally we are in the business to sell our product at a fair and reasonable profit, and we have to do this to keep the gas industry where it belongs."

• • •

The geniality and unfailing courtesy under constant pressure of E. Holley Poe at all times won him the friendship of all in his first convention as secretary of the Natural Gas Department.

• • •

MERRILL N. DAVIS, president, Association of Gas Appliance and Equipment Manufacturers, Bradford, Pa.: "There are in service today more than 16 million gas ranges and it has been estimated that at least 75 per cent of these are obsolete, non-automatic, relatively inefficient and unattractive. In other words, we have 12 million customers who are not getting as good gas cooking service as can be made available to them."

• • •

The merits of the C.P. Range were extolled at various spots in the program, and it was advocated as a big opportunity for the gas industry to assert the leadership it merits in the domestic cooking field.

• • •

W. W. WINTER, Atlanta: "It is splendid to wear laurels on your brow, but don't think for a moment that we can browse on our laurels."

• • •

A grand southern moon was shining as the delegates took the boat ride along the Mississippi. Few saw it, but the orchestra worked awfully hard below deck.

• • •

J. FRENCH ROBINSON, Pittsburgh: "We have had practically no objections to this method of operations (pools of royalty interests) by any of our lessors. The practicing attorneys, county agricultural agents and bankers in the operated areas are enthusiastic in their endorsement of the unit plan, as being the most logical and equitable method under which to operate deep sand gas and oil properties."

• • •

The Home Service girls were fine . . . but there weren't enough of them.

• • •

JUDGE ALEXANDER MAHOUD, president, National Association of Utilities and Railroad Commissioners: "Typical of increases faced by operators in the utilities field, Public Service Co. of New Jersey pays 17.7 per cent more. Consolidated Gas Co. of Baltimore, 36.4 per cent and the Niagara-Hudson Co., 30.1 per cent. The average telephone user in the U. S. is paying an indirect tax of $9.21 a year for his telephone bill. In New York City the average customer for electric light and gas pays more than 20 per cent of his bill to help the company meet its taxes. These taxes are a part of the cost of operation and it is the customers that eventually pay them."

• • •

According to Gene Milener, secretary industrial section, A.G.A., the attendance at the industrial sales meetings was the best he had ever seen at any convention. A fine compliment to the men on the program.

• • •

CECIL F. ELMES, New York: "Unemployment is today the paramount problem and there can be no return to our old time prosperity in these United States until it is solved. And unemployment cannot be solved save by the investor and his supplies of capital ($36,000 per employee in the gas business). The day for heedless, thoughtless 'cracking down' upon utilities or other groups of investors is, or should be, over. It is no longer a public service. It is time to emphasize that every regulatory act, every utterance by a responsible public servant that frightens capital back into hiding . . . does a public wrong."

• • •

Few of the delegates spoke French, but none of the boys seemed to have any difficulty finding their way around the French quarter.

• • •

HERMAN RUSSELL, Rochester: "I do not think there can be any permanent cure by the policies this government is following."

• • •

The ladies took a whole day plantation tour in which they visited several of these pre-bellum estates. At noon they enjoyed a delicious Louisiana Creole lunch.

• • •

R. M. CONNER, director, A.G.A. Testing Laboratories, Cleveland: "The contemporary gas range is, without important exceptions, the superior of its electric competitor in accomplishing the only practical purpose for which they are both designed, namely, the preparation of food by the application of heat."

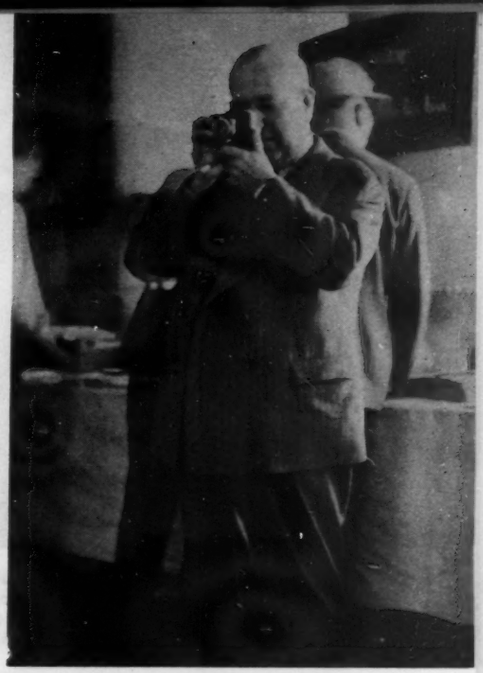
• • •

Special commendation is due Kenneth Eilers and M. A. Schellhardt of the U. S. Bureau of Mines for their report entitled "Flow characteristics, composition, and some liquid phase properties of samples from a combination well." The production commit-

(Turn to Page 25)

GAS CAMERA

. . . Focused on New Orleans Snaps Natural Gas Delegates

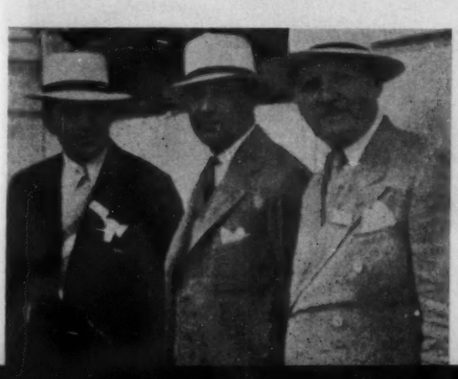


B. M. LAULHERE, Southern California Gas Co., focuses his camera to take one of the several pictures appearing on this and the following pages.

Headliners: MERRILL N. DAVIS, S. R. Dresser Mfg. Co. and A. G. A. E. M. president; FRANK L. CHASE, Lone Star Gas Co.; and N. C. McGOWEN, United Gas Pipe Line Co. and A. G. A. president.

The Natural Gas Department's secretary, E. HOLLEY POE and chairman, ROBERT W. HENDEE hold a conference.

Columbia Gas and Electric Corporation executives WALTER C. BECKJORD and T. B. GREGORY line up with M. N. BAILEY and JOHN C. DIEHL of American Meter Co.

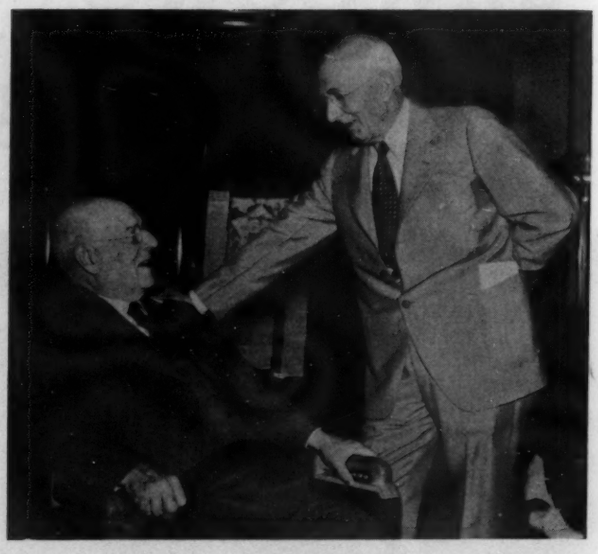


The three "big" men at the convention: (at right) I. C. LITTLE, Dallas; J. C. REINBOLD, Panhandle Eastern Pipe Line Co.; and W. S. BIBB, Bibb Contracting Co.

In the center (left): H. P. MUELLER, L. J. Mueller Furnace Co.; on either side, G. R. LOCKE and F. S. RUTHERFORD, Republic Steel Corp.

Gas Delegates M

The home service delegates pose in a group: KAREN FLADOES, Peoples Gas Light and Coke Co.; GLADYS B. PRICE, Southern California Gas Co.; MILDRED CLARK, Oklahoma Natural Gas Co.; JESSIE McQUEEN, A. G. A.; ALBERTINE BERRY, Lone Star Gas Co.; MARGARET MARABLE, Servel, Inc.



A conversation at ease: T. B. GREGORY, Columbia Gas and Electric Corp. and (standing) J. R. MUNCE, Arkansas-Louisiana Gas Co.

W. E. DERWENT, Geo. D. Roper Corp., snapped with Panhandle Eastern Pipe Line executives, J. D. CREVELING and J. C. REINBOLD.

At left: P. E. FLUOR, The Fluor Corp. and GEORGE T. KOCH, Panhandle Eastern Pipe Line Co.

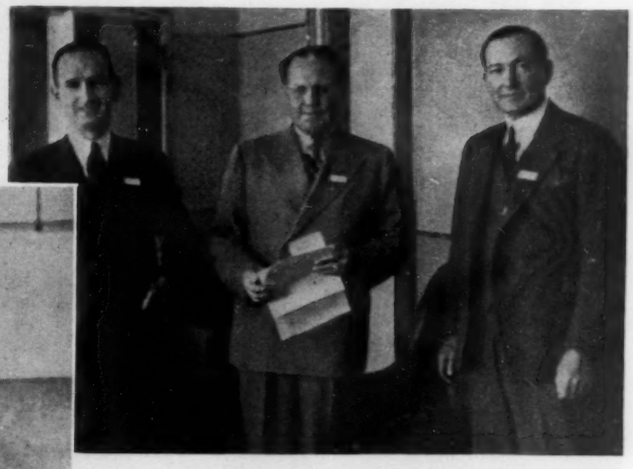
WILLIAM MOELLER, Jr., Southern California Gas Co. and JULIAN FOSTER, Lone Star Gas Co.

CHARLES E. GILL, Sharples Solvent Corp.; T. C. RODERICK, Fort Dodge Gas & Electric Co.; I. E. SPINDLE, Grand Rapids Gas Light Co.; BERT P. FISHER, Payne Furnace & Supply Co.

Meet Informally

Reading from left to right, A. C. BLACK, Southern Union Gas Co.; J. H. DUNN, Lone Star Gas Co.; A. E. HIGGINS, Pittsburgh Equitable Meter Co.; F. L. CARMICHALL, Lone Star Gas Co.; C. H. ZACHRY, Southern Union Gas Co.

C. K. PATTON, Dallas Gas Co.; W. J. MacINTYRE, Arkansas-Louisiana Gas Co.; L. L. DYER, Lone Star Gas Co.



W. M. JACOBS, Southern California Gas Co.; NORMAN R. McKEE, Southern Counties Gas Co.; R. M. CONNER, A. G. A. Testing Laboratories.

J. C. DALLOW, The National Supply Co. greets J. D. TAYLOR, Pittsburg Water Heater Co.

A. I. WALLACE, American Gas Products Corp. and CHAS. D. GREASON, Gas Service Co., caught in a sidewalk conversation.

Four delegates enjoy a laugh—GEO. S. JONES, Servel, Inc.; C. F. WILSON, Lone Star Gas Co.; BEN R. NEWBERY, Lone Star Gas Co.; and W. F. WRIGHT, Dallas Gas Co.

Between-Sessions Shots at Annual Natural Gas Department Convention

Col. W. F. ROCKWELL, Pittsburgh Equitable Meter Co.; H. M. CRAWFORD, Pacific Gas and Electric Co.; W. W. WINTER, Atlanta Gas Light Co.; J. S. SPAULDING, Southern California Gas Co.

Inset (at left): THOMAS R. WEYMOUTH, Columbia Gas & Electric Corp. Below: F. T. PARKS, Public Service Co. of Colorado, discusses a point with HALE A. CLARK, Detroit City Gas Co.

Below: Q. R. DUNGAN, Cities Service Gas Co.; C. I. WALL, West Texas Gas Co.; A. E. HIGGINS, Pittsburgh Equitable Meter Co.; L. H. HUNGATE, Jr., Memphis Power and Light Co.; D. W. REEVES, Oklahoma Natural Gas Co.

ABOVE (back row): R. L. HAYDEN, Coast Counties Gas and Electric Co.; K. C. TOMLINSON, American Meter Co.; M. L. FORT, Industrial Fuel Supply Co.; B. M. LAULHERE, Southern California Gas Co. Front row: FRANK H. MUELLER, Mueller Co.; A. R. BAILEY, Coast Counties Gas and Electric Co.

Above: Front view, G. R. LOCKE, Republic Steel Corp., and STANLEY JENKS, editor, G A S, discuss industry problems.

BELOW: HENRY O. LOEBELL, Natural Gas Pipe Line Co.; GEO. W. BEAN, A. G. A.; PAUL J. DORSEY, Cribben & Sexton Co.

tee thought this report a classic and well worth the study of every natural gas production man.

• • •

HENRY O. LOEBELL, Chicago: "Markets are personalities. They change their habits and customs and call for constant study and analysis."

• • •

With the new type of lapel "mike" the speakers in the general sessions were well wired for sound. There wasn't a 'sustaining' program in the bunch.

• • •

GEORGE BEAN, A.G.A., Washington, D. C.: "In 1932, the gas industry was selling to the U. S. government three billion cu. ft. of gas annually. In 1937, we had more than 700 gas contracts in operation and the annual consumption was in excess of 20 billion cu. ft."

• • •

Jay Barnes and his general arrangements committee worked energetically to make everything run smoothly, and they succeeded in a big way.

• • •

L. R. BOULWARE, Syracuse: "Among the things you may do to realize the gas industry opportunity in air conditioning, I recommend that you air condition your own offices and display rooms, first, for its advertising of your being consistent when you recommend that others buy air conditioning; second, for the benefit to the efficiency of officers and employes; and third, for the enhancement of your public relations through your so obviously being a modern business man, considerate of the comfort of your personnel and customers."

• • •

According to Bruce Wilson, F.H.A., who addressed the joint luncheon meeting of the Natural Gas department and the Member's Council, New Orleans Association of Commerce, the building industry is concentrating its mass effort on small houses, because 80 per cent of American families have an income of less than $2500 a year, and double the annual income is rated the maximum limit in sound home investing.

• • •

ALBERTINE BERRY, Dallas: "Our salesmen enjoy doing their own cooking; they vie with each other for cooking honors, and take great pride in the results."

• • •

The senior gas engineering class of Texas College of Arts and Industry attended the Wednesday sessions and were introduced individually by their own "Bob Burns" Halsey.

MILDRED R. CLARK, chairman home service section, A.G.A., Tulsa: "Some 485 gas companies employ 1150 women in home service work. All are graduates in home economics, and all know the problems of the home from the woman's viewpoint."

• • •

The Grand Ball drew a large and happy crowd. And the floor show certainly floored the delegates.

• • •

KAREN FLADOES, Chicago: "Our sales floor demonstrations are definitely effective because they are promotional helps directly at point of use."

• • •

Each lady of the convention was presented with a copy of the Times-Picayune Creole cookbook. All the little woman needs now is a C.P. range.

• • •

GRACE LARRABEE, Algiers: "A great many utility companies are today maintaining home service organizations that function in the same manner for dealer and utility."

• • •

The weatherman was very kind, and gave the convention the best kind of air-conditioning. It helped a lot in keeping the meetings peppy.

• • •

J. WOODWARD MARTIN, Dallas: "A vast rural market exists for gas service. Based on the 1930 Federal Census, it is estimated that there are 15 million families throughout the U. S. without gas service. This market is becoming more and more conscious of gas as a fuel and is rapidly applying liquefied petroleum gas to its household and industrial needs."

• • •

The publicity committee did a swell job and the New Orleans dailies carried running stories of the convention.

• • •

W. M. JACOBS, Los Angeles: "It must be remembered that the dealers' interest is selling equipment (commercial heavy duty); utilities should assume the fuel selling job whenever competition exists in a sale. Furthermore, if dealers who are covering the field experience only equipment sales competition from the utility, it is only natural that the dealer direct his efforts to competitive fuel equipment."

• • •

DAVID M. DEBARD, New York: "The sale of natural gas for domestic purposes was only 27.2 per cent of the total sold in 1937. But let me call your attention to something else. That same 27.2 per cent by volume produced 56.0 per cent of the total dollars you took in. . . . The residential load is the home load; the home load is controlled by the wife; the wife will tell her husband; the husband pays the bills."

• • •

Next year's natural gas convention will be at Tulsa, Oklahoma.

• • •

FRANKLIN T. RAINEY, Columbus: "It is my opinion that gas today is enjoying a high position as a commercial and industrial fuel, and is continually gaining increased acceptance. However, its continuance can be insured only by the continuous development and efforts of well trained and skilled sales organizations."

• • •

According to N. C. McGowen, in 1926, about 4,515 cities, towns and communities in the United States were served with gas, of which 1,878 were supplied with natural gas, and 2,637 with manufactured gas. By 1936, 8,601 cities, towns and communities (an increase of 90 per cent) were enjoying gas service, with natural gas showing an increase of 174.0 per cent, and manufactured gas, 31 per cent in the number of communities served in this 10-year period.

• • •

C. H. FRENCH, New York City: "The commercial or volume cooking consumer is without question the most staple and profitable class of customer the gas company has on its lines. He feels that he is something more than just a domestic customer and is entitled to more attention from the gas company—not only from the sales department, but also and especially from the service department. Commercial equipment must at all times be in proper adjustment. It is the service rendered by this department that will do more than anything else to hold your customers satisfied."

• • •

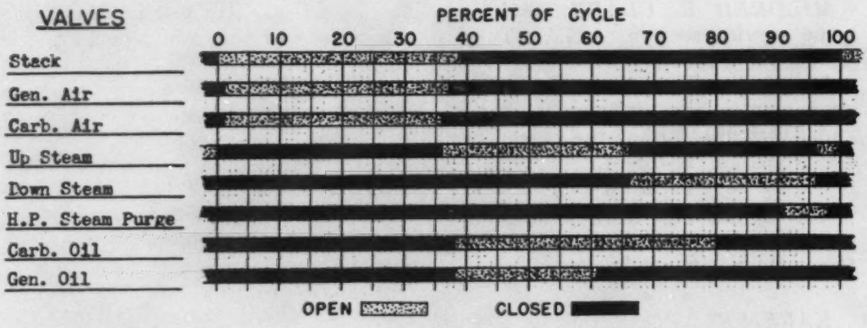
NORMAN R. McKEE, chairman of the Resolutions Committee, introduced a resolution to the effect "that the American Gas Association study the subject of gas research as now conducted by various members of the association to devise a specific program of pure and applied research to further the present uses of gas and explore possible new uses, and to make concrete recommendations as to the establishment of an institute of gas research along these lines."

• • •

H. CARL WOLF, Muncie, Ind.: "The industry faces the future leaning on one development—that is research in new utilization."

• • •

The attendance at the last day's morning session . . . after the ball was over . . . was surprisingly good.



Specific Gravity	0.57-0.58	0.61-0.62	0.65
Temperature T_2 (Middle of Superheater)	1725°	1630°	1580°
Up Make Steam, lbs per min.	60	60	60
Down Make Steam, lbs. per min.	60	60	60
Generator Air, cu.ft. per min.	12,000	11,000	10,200
Carb. Air, cu.ft. per min.	12,000	11,000	10,200
Total Oil, gals.	154	148	135
Oil on Fire	10-15%	10-15%	10-15%

FIG. 1. Up and down cycle.

The Manufacture HIGH B.t.u.

By H. VITTINGHOFF

Consulting Engineer
Stone and Webster
Engineering Corp.*

DURING 1937 the Public Service Co. of Northern Illinois decided to build an addition to a plant to produce high B.t.u. carburetted water gas and commissioned Stone & Webster Engineering Corp. to design and construct such a plant. The company normally purchases its gas through The Peoples Gas Light & Coke Co., Chicago, and this gas is a mixture of natural gas, reformed natural gas, coke oven gas, and carburetted water gas. The proportion of components varies materially from season to season but they are always so adjusted as to produce a mixed gas with reasonably constant burning characteristics as well as a uniform heating value of 800 B.t.u. approximately.

In building this plant Public Service had three specific purposes in view: First, to maintain itself in position to produce a certain number of therms of gas per day, second to produce gas which when mixed with the gas obtained from Peoples Gas would augment the natural gas purchased by the combination of the two companies in such a way as to control the load factor of natural gas purchases. Third, to make a gas which could be substituted for the mixed gas normally furnished by Peoples Gas in the event of a natural gas service interruption.

Under the conditions governing operation of Public Service Co., their production plants are concurrently called upon to operate only for relatively short periods annually, and obviously it was necessary to develop a plant low in capital cost so as to reduce to a minimum fixed costs on the gas produced. At the same time the plant had to be such that in emergency it could be started up quickly and brought to proper functioning within a very short period of preliminary operation.

The generating equipment finally selected was a 12 ft. Semet-Solvay Engineering Corp. Reverse Flow Set equipped with a 9-cam U.G.I. automatic control and a turbine driven blower capable of delivering 32,000 cu. ft. per minute under a pressure of 50 in., all housed in a new steel-frame building. The set was equipped with hot valves since it was felt that in the production of high B.t.u. gas the capacity of the carburettor and superheater would be heavily taxed due to the large quantity of oil which had to be handled per cycle and, therefore, the back run system of operation appeared to present no merits. Auxiliary equipment was also provided, but does not require any further description since it was of standard design and did not differ in any respect from the usual apparatus found in water gas plants.

The details of construction of the set are well known through the descriptions disseminated by Semet-Solvay Engineering Corp. and the following discussion concerns itself mainly with the results obtained during the acceptance test.

Test Results

It was recognized that, especially with respect to the phase of the problem referring to the production of a substitute gas similar in characteristics to that furnished by Peoples Gas Co., the operation of the set was largely a matter of experimentation and that in starting up the operators would have to feel their way in order to develop the most suitable procedure. For this reason, but particularly because of the stringent requirements as to interchangeability of gas placed upon the production department by the distribution department of the company, the test work as actually carried out was restricted to relatively short periods on the days when the set was operated. Actually, during the test period extending over approximately five weeks, the set was operated at about 1/10 of normal daily rating. The long shut-downs and short daily operating periods naturally had an adverse effect on the results obtained and it is reasonable to assume that normally much better efficiencies could be obtained both in respect to solid fuel and oil consumption.

The materials used were a high grade of by-product coke with very low ash content and a 32° to 34° A.P.I. gravity gas oil of excellent enriching characteristics.

During the days when it was attempted to make a gas suitable to augment the supply of mixed gas furnished by Peoples Gas Co., results as shown in Table No. 1 were obtained.

It will be noted that there is a considerable variation from day to day in the specific gravity, heating value and hydrogen content of the gas manufactured, but since each of these days represents only a relatively few hours of operation it can be safely assumed that under normal conditions such variation would be smoothed out as the gas passed through the relief and storage holders before being delivered into the distribution system. Furthermore, under continuous operation the

*Excerpts from a paper, "The Manufacture of High B.t.u. Carburetted Water Gas," presented before the American Gas Association Joint Conference of the Production and Chemical Committees, Hotel Pennsylvania, New York, N. Y., May 25, 1938.

and Standby Use of
CARBURETTED WATER GAS

large variations shown by the figures in Table No. 1 (see page 28) would not have occurred.

While the production department was making this gas, the distribution department of the company conducted a series of tests on a large number of appliances under widely varying burner adjustments representing the extremes of adjustments which might be found in the field and it was shown that the gas as made was entirely suitable to be mixed in equal proportions with gas furnished by Peoples Gas Co. and to be sent out into the distribution system without in any way inconveniencing any customers through the malfunctioning of appliances. It is true that the burning characteristics of the gas manufactured in the set were somewhat different from those inherent in the gas furnished by Peoples Gas Co. as could be noted in the laboratory when changing from one gas to the other. It is questionable that any but a very few customers would actually observe any change in behavior in their own appliances.

Typical analyses of the gas made during January 28, the gas furnished by the Peoples Gas Company to Public Service Company of Northern Illinois, and a 50-50 mixture of the two, are as follows:

	Test Gas Jan. 28	*Peoples Gas Co.*	*50-50 Mixture*
CO_2	1.1%	1.0%	1.0%
Olef	15.8	2.1	9.0
O_2	0.6	0.2	0.4
CO	13.7	2.8	8.3
H_2	30.5	24.8	27.6
CH_4	33.1	55.6	44.4
C_2H_6	1.4	6.8	4.1
N_2	3.8	6.7	5.2

Blue Gas ..... 34.7%- 297 B.t.u.
Oil Gas ..... 65.3%-1140 B.t.u.
Cu. ft. Oil Gas per Gal..... 79.8
B.t.u. per Gal. 91,200

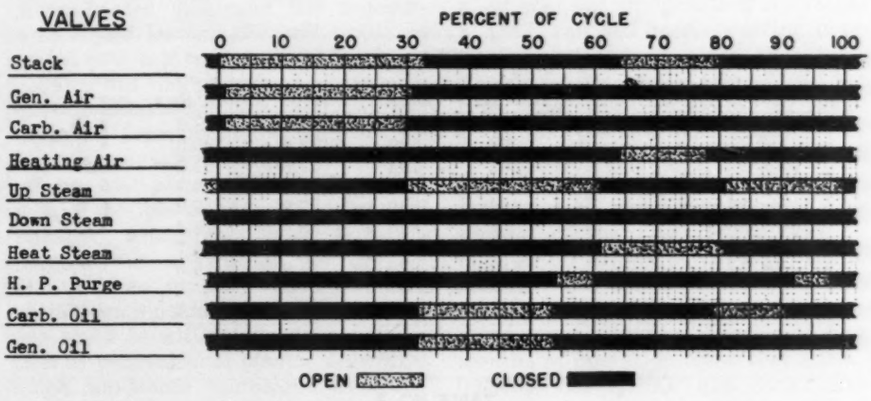
It is interesting to note that this mixture which, by the consensus of opinion of all concerned, was a satisfactory substitute for the gas normally sent out by Public Service Co. of Northern Illinois varied largely in chemical composition from the latter gas. However, it is not claimed that the gas made in the set during these particular test runs would be satisfactory under normal conditions as a 100 per cent substitute for the gas normally delivered by Peoples Gas Co.

Fuel Consumption Data

It was not possible to determine accurately the weight of fuel used for production as distinguished from the total fuel used for both production and bringing the set up to heat after long standbys, but from such observations as could be made it appears that the fuel consumption was not in excess of 21 lbs. of coke per M c.f. while the oil consumption to make 820 B.t.u. gas averaged only 8.46 gals. per M c.f. or approximately 8.25 gals. for 800 B.t.u. gas. Under normal conditions the set should perform at the rate of 10.5 cycles per hour so that during a 22-hour operating day the rating of the set as established by the intermittent test works out to 4250 M c.f. of 820 B.t.u. gas equivalent to 35,000 therms per day.

One of the conditions which the manufacturer of the set undertook to meet was the continuous operation of the set without an undue amount of difficulty from lampblack or heavy tar formation. On the basis of the observations made during the test period it can be definitely stated that when making a gas with a gravity of .62 or .63 the operators will not encounter any difficulty in the handling of tar nor will carbon deposits tend to be built up in the machine.

The above tests indicated that the machine could readily make the required quantity of gas of a quality suitable for admixture with gas furnished by Peoples Gas Company, but it remained to be shown that the machine could make a substitute gas which could be burned in the appliances of the customers of Public Service Co. of Northern Illinois without having to resort to a general campaign of appliance adjustments or, indeed, without inconveniencing the customers because of the change in gas characteristics especially in connection with appliances now adjusted on the hard side, i.e. appliances with air shutters adjusted so as to give a relatively large proportion of primary air and a relatively small proportion of fuel. The operators of Public Service Co. thought that an



Specific Gravity	0.57-0.58	0.61-0.62	0.65
Temperature T_2 (Middle of Superheater)	1725°	1630°	1580°
Make Steam, lbs. per min.	60	60	60
Heat Steam, lbs. per min.	140	140	140
Gener. Air, cu.ft. per min.	12,500	11,500	10,800
Carb. Air, cu.ft. per min.	11,000	10,500	10,000
Heat Air	14,200	14,000	13,700
Total Oil	154	148	135
Oil on Fire	10-15%	10-15%	10-15%

FIG. 2. Heat up cycle.

ideal situation would be for such a gas to have a specific gravity of about 0.54 and a hydrogen content not in excess of 32 per cent. This objective was not quite reached as any attempt to reduce the gravity to the point indicated was always accompanied by an increase in hydrogen content which was not desirable because of its effect on burner performance.

During the trials when it was attempted to make a low gravity high B.t.u. gas, results as shown in Table No. 2 were obtained.

A typical analysis of this type of gas is represented by the following:

CO_2	0.7	per cent
Olef.	10.5	per cent
O_2	0.5	per cent
CO	11.9	per cent
H_2	36.5	per cent
CH_4	34.1	per cent
$C_2H_6N_2$	5.8	per cent
Blue gas	31.0	per cent—277 B.t.u.
Oil gas	69.0	per cent—953 B.t.u.
Cu. ft. oil gas per gal.	85.2	per cent
B.t.u. per gal.	81,000	

The capacity of the set was practically the same as that observed when making gas for somewhat higher gravity while the oil consumption rose only to 8.59 gal. per M for making 794 B.t.u. gas which is equivalent to approximately 8.7 gal. per M for 800 B.t.u. gas. The hydrogen content of this gas was somewhat higher than desired and the burning characteristics were markedly different from those of Peoples Gas mixture. However, the only case of a malfunctioning of any of the appliances which was observed occurred in the case of a single burner which had been deliberately adjusted to produce an extremely hard flame with the Peoples Gas mixture and which flashed back when the pressure on the burner was deliberately lowered from 5 in. to 3 in. —an extreme test. If in an emergency it had become necessary to distribute this gas in substitution for Peoples Gas, it is believed that the situation could have been adequately met without putting a serious strain, in the form of complaint calls, on the distribution department. The tests made in the laboratory on the appliances were not, and could not be, sufficiently all-inclusive to permit positive proof of such a statement. The belief expressed is based on the consideration that since a mixture of equal parts of gas furnished by Peoples Gas Co. and 0.63 specific gravity gas manufactured in the set resulting in an average specific gravity of 0.59 was actually sent out into the district without causing any increase above the normal number of daily complaint calls whatever, therefore, if in an emergency, gas be sent out having a gravity of 0.576, such gas should not result in an undue increase in complaint calls, even though the somewhat higher percentage of hydrogen would result in a change in burning characteristics.

While making gas of this lower gravity, it was observed that greater quantities of carbon were deposited in the set than when 0.63 gravity was made and some trouble was experienced due to heavy tar. The carbon deposits which were observed were not so heavy but that regular scurfing of the set for one or two hours a day should prevent the blocking of any part of it with carbon, and the trouble experienced with heavy tar was not so serious but that with close attention given to this phase of operation, interference with production need not be feared.

As a matter of fact only the heavy tar which settled in the cone bottom of the wash box and which was not carried out of the wash box regularly with each cycle was the cause of the minor trouble experienced, and it was found that when this heavy tar was mixed with the light tar, simultaneously formed and carried away regularly, the mixture became sufficiently fluid to permit normal handling by the available pumping equipment. A slight modification in the method of handling the tar from that pursued during the test period should avoid any serious difficulty from this source.

Two Methods of Operation

The manufacturers of the set proposed two alternative methods of operation, one, the standard "up and down cycle" and the other a so called "heat-up cycle" which consisted of a standard blast followed by an up-stream run and followed in turn by a reheat period during which steam was passed downward through the generator and the resulting blue gas burned in the carburettor and superheater, this reheat period being followed by a second up-steam run. The two cycles are illustrated by Fig. 1 and Fig. 2 on which are also indicated numerical values relating to temperatures and quantities of air, steam and oil which appear suitable for making the type of gas under consideration.

The observations made did not seem to indicate that the heat-up cycle had any particular merits as far as the production of 800 B.t.u. gas was concerned, although, since this heat-up cycle would tend to dampen out temperature fluctuations it may be distinctly valuable when making a 1000 B.t.u. gas involving the use of still greater quantities of oil per cycle. There are, of course, other methods of operation available to the experimenter and the one which occurs immediately is the introduction of steam into the carburettor together with the oil, with the possibility of performing a measurable degree of methane synthesis. As far as could be told, whatever methane was produced during the test period originated from pyrolysis only. The addition of steam into the carburettor is indicated when it is considered, that whereas normally a large amount of undecomposed steam passes through the generator, in this case, when mak-

(Continued on Page 30)

TABLE NO. 1

Date	*Sp. Gr.*	*B.t.u.*	*H_2%*	*M c.f. Make/Run*	*Gal. Oil per M c.f.*
Jan. 10	.60	780	29.8	18.2	8.45
Jan. 11	.64	826	32.6	20.0	8.60
Jan. 12	.62	794	31.8	21.6	8.25
Jan. 14	.62	825	33.3	18.7	9.10
Jan. 19	.64	830	27.9	17.9	8.40
Jan. 20	.62	844	33.4	18.4	8.41
Jan. 28	.63	832	30.5	16.7	8.20
Jan. 31	.64	829	25.9	15.6	8.27
Average	.626	820	30.6	18.4	8.46

TABLE NO. 2

Date	*Sp. Gr.*	*B.t.u.*	*H_2%*	*M c.f. Make/Run*	*Gal. Oil per M c.f.*
Jan. 10	0.57	787	36.5	20.5	8.10
Jan. 20	0.58	794	37.8	18.3	8.60
Jan. 25	0.59	812	35.1	17.1	8.52
Jan. 26	0.57	795	39.8	18.9	8.78
Jan. 27	0.57	781	36.9	17.1	8.97
Average	0.576	794	37.2	18.4	8.59

● T. S. BACON, research engineer, Lone Star Gas Co., Dallas, Texas, in a paper, "Combination Gas Dehydration and Desulphurization Plant," presented before the Annual Convention of the Natural Gas Department, American Gas Association, New Orleans, La., May 9-12, 1938—(Abstract by G A S).

T. S. BACON

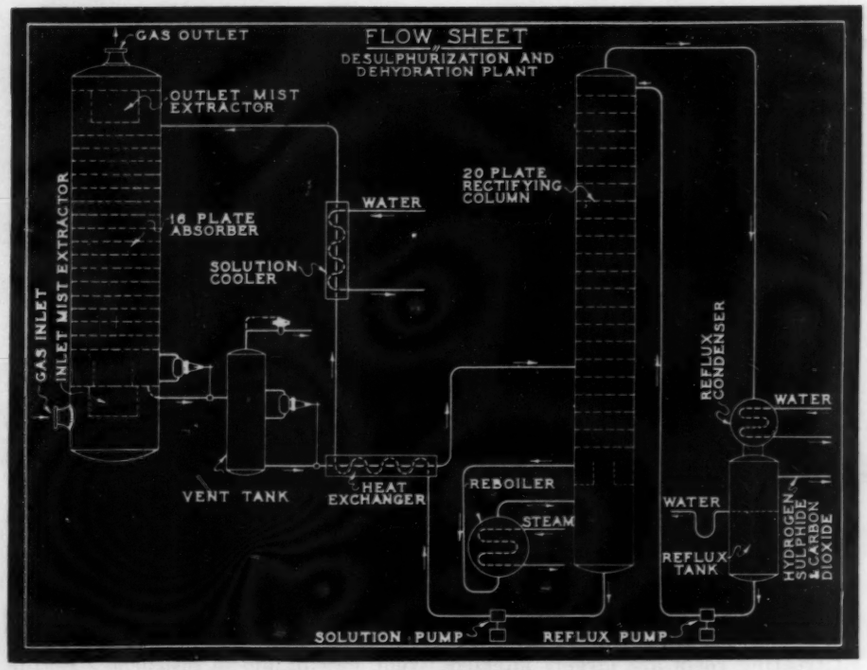


FIG. 1. Flow sheet of desulphurization-dehydration plant.

A Combination Dehydration, Desulphurization Plant

A RECENT problem of desulphurization of natural gas resulted in the design of an unusual plant for removing water vapor and hydrogen sulphide from natural gas in a single step. The Northern Natural Gas Co. was taking gas from a field in Rush County, Kan. The field pressure was in the vicinity of 900 lbs. per sq. in. and the line pressure ranged from 350 to 450 lbs. per sq. in., hence water condensation in this particular line was negligible. The gas entering the line was sweet when the line was laid, but many wells in the field have since become sour, and it recently became necessary to install a desulphurization plant in this field. A survey of the available desulphurization processes was made and it was found that any known process would add appreciable quantities of water vapor to the treated gas. In fact, sufficient water vapor would be added to the gas to cause condensation of water in the transmission lines leaving the desulphurization plant. The Northern Natural Gas Co. had already become aware of the advantage of gas dehydration, and was installing two dehydration plants at other points on their system at that time. It was, therefore, believed imperative to install a dehydration plant after the desulphurization plant. In this particular case, the cost of dehydration would have to be added to the cost of desulphurization, as the operation of the sulphur-removal plant would make necessary the operation of the dehydration plant.

A study of the cost factors and chemical factors involved indicated that dehydration and desulphurization possibly could be accomplished in a single plant in the Rush County Field. The agent for hydrogen sulphide removal would be physically mixed with the agent for dehydration instead of with water as is the normal practice in desulphurization plants. The resulting liquid mixture would then be brought in contact with the gas to be purified in a conventional gas scrubber. The fouled solution leaving the scrubber would be freed of the absorbed water vapor and hydrogen sulphide by boiling in a steam-heated still, and the regenerated liquid leaving the still would be cooled and returned to the absorber.

Time did not permit any extensive experimental work, but the plant was designed from available data to use a diethylene glycol-monoethanolamine mixture. All plant units were designed where possible so they could be used either in a straight desulphurization plant or in a straight dehydration plant. Then in the event of failure of the combination plant, the apparatus could be utilized in the construction of conventional plants. However, much additional equipment would be required, and much additional expense would be involved, if it were found necessary to substitute a conventional desulphurization plant and a dehydration plant for the proposed combination plant. The flow sheet of the plant as built is shown in Fig. 1. This plant has a designed capacity of 40,000 M c.f. per day at 400-500 lbs. per sq. in. gage pressure with 20 grains of hydrogen sulphide per 100 cu. ft. of inlet gas.

It was estimated, prior to plant operation, that the treated gas would have a dew-point of 30-40° F., and would contain about 0.7-0.8 grains of hydrogen sulphide per 100 cu. ft. The plant was put in operation November 2, 1937, and has been operating practically continuously since that time. The dew-point of the treated gas has been determined as averaging about 0° F. and the hydrogen sulphide content of the gas has consistently been less than 0.2 grains per 100 cu. ft., even though the hydrogen sulphide content of the raw gas has run as high as 50 grains per 100 cu. ft. instead of the maximum of 20 grains that was originally estimated. Operating data covering the first four months of operation show that 1,934,000,000 cu. ft. of gas have been treated with a total glycol loss of 190 gals. and a total amine loss of 30 gals. On this basis, the cost of chemicals consumed per M c.f. of gas treated is roughly a quarter of a mill. Steam and cooling water consumption are both lower than were anticipated, due to the elimination of reflux from the reactivation still.

TABLE NO. 1. OPERATING DATA—DEHYDRATION-DESULPHURIZATION PLANT.

	Nov. 1937	Dec. 1937	Jan. 1938	Feb. 1938
Gas treated (Million cu. ft)	515.5	672.7	413.3	332.4
Gas pressure (Pounds per square inch gage)	402	396	392	389
Gas temperature (Degrees F.)	58	52	49	47
Treated gas—Dew-point (Degrees F.)	4.7	0.0	0.4	0.0
Treated gas—Hydrogen sulphide (Grains per 100 cu. ft.	0.25	0.10	0.14	0.05
Raw gas—Hydrogen sulphide (Grains per 100 cu. ft.	23.4	25.7	13.3	20.0
Still kettle temperature (Degrees F.)	260	260	260	260
Still pressure (Pounds per square inch gage)	5.0	5.0	5.0	4.7
Reflux to still (Gallons per hr.)	0	0	0	0
Glycol make-up (Gallons)	10	80	50	50
Amine make-up (Gallons)	0	0	25	5
Solution rate (Gallons per min.)	19.6	23.0	17.7	11.1

Power consumption also is low, as the solution rates do not exceed 25 gals. per minute on this plant. No operating difficulties have arisen to date, and there has been no evidence of excessive plant corrosion, or of gum deposits on the heating surfaces. Overall treating costs are largely affected by the actual life of the plant, and by the load factor at which the plant operates. Royalty payments must also be considered in this connection, as basic patents are held by Girdler Corp. on the use of amines for desulphurization of gas and other patents have been applied for. Estimates at present indicate that the total treating cost in this particular plant including depreciation, corrosion allowance, and maintenance will be about 1.5c per M cu. ft. with an average annual load factor of 20 per cent of plant capacity. Table No. 1 shows plant operating data in some detail.

The circulating solution used contains 7-8 per cent monoethanolamine, 75-80 per cent diethylene glycol, and 12-16 per cent of water by volume.

The operation of the plant is automatic, as the solution rate is determined by the pump speed. Liquid level controllers on the liquid outlet from the absorbers and vent tank maintain a constant feed of spent solution to the still at a rate equal to the pumping rate. The base of the reactivation still serves as a surge tank, to equalize slight discrepancies between the solution rate to and from the still. No reflux is returned to the still under present operation. Condensate leaving the reflux condenser is accurately measured to give a check on dew-point determination, and the amine content of the condensate is periodically determined.

The results actually obtained by the plant, as listed above, were found to be far better than the estimated results. These favorable results have largely been obtained by the elimination of reflux from the activation still. Amine desulphurization plants have required reflux in the reactivation still to prevent excessive loss of amine in the vapors leaving the still. Glycol dehydration plants have used reflux in the reactivation still to prevent loss of glycol overhead. In the combination plant, hydrogen sulphide and carbon dioxide are liberated from the amine compound rapidly, and without sustained boiling of the solution. These liberated gases serve to reduce the partial pressure of water vapor over the solution in the still kettle, and hence assist in stripping water vapor from the solution. The still kettle temperature has been maintained at 260° F. consistently. Decomposition of the amine-hydrogen sulphide compound is more rapid at this temperature than it is at the lower temperatures at which amine water solutions are generally regenerated. The presence of the glycol may also assist in increasing the decomposition rate of this compound. Further, the presence of the glycol probably tends to reduce vaporization of the amine. However, plant records indicate that results obtained may be slightly affected by the relative amounts of acid gases and of water vapor that are liberated in the still.

The total elimination of reflux to the reactivation still reduces the amount of heat that must be applied to the still, and therefore increases the economy of plant operation. Analyses of the overhead vapors from the still show that the loss of amine and glycol in these vapors is very small. The small magnitude of this loss is shown definitely by the fact that only small amounts of glycol and amine are added to the plant as make-up. Thus, the use of the combination solution in a single plant, rather than the use of two separate solutions in two separate plants, enables superior operating results to be obtained at lower operating costs with reduced initial investment.

It appears that the amine-glycol combination may be useful for dehydrating sweet gas that contains some carbon dioxide where low dew-points are required. It also appears possible to effect economies in the desulphurization of sour gas by the use of the glycol-amine solution, even though dehydration of the gas is not required.

High B.t.u. Carburetted Water Gas

(Continued from Page 28)

ing only small proportions of blue gas and using small quantities of steam per cycle, very high generator temperatures are encountered with the result that steam decomposition is carried far beyond the normal ratio. No definite statements in regard to this method of operation can be made since it was not tried out during the test period, but it appears to merit a trial.

It will be recalled that in the Semet-Solvay Reverse Flow water gas machine, the blue gas is introduced at the base of the carburettor whereas the oil is injected into the top. In spite of the abnormally large quantities of oil used, distillation of the oil was apparently completed in the carburettor as no accumulations were found in the base except when undue quantities of oil were used during the early runs of a day after a long shut-down and before the carburettor had been properly brought to temperature. This counter current flow of gas and oil results in an action which may be termed distillation in suspension, and appears to have several very desirable results. It appears to prevent the over-cracking of the lighter parts of the oil and avoids the formation of naphthalene, of which not more than the merest trace was found in the gas.

In conclusion it should be said that the production of high B.t.u. gas of specific characteristics is not an easy matter. Neither this set nor any other piece of equipment with which the writer is familiar will produce the desired results in the hands of careless and unskilled personnel, but the tests indicate that the Reverse Flow Set is an excellent tool in the hands of a skilled operator.

A Study of Gas Hydrates In Natural Gas Pipe Lines

● **W. M. DEATON and E. M. FROST, Jr., U. S. Department of the Interior, Bureau of Mines, Amarillo, Texas, in a progress report, "Gas Hydrates," presented before the Annual Convention of the Natural Gas Department, American Gas Association, New Orleans, La., May 9-12, 1938.—(Abstract by GAS).**

THE study of gas hydrates and their relation to the operation of natural gas pipe lines has been continued throughout the past year by the Petroleum and Natural Gas Division of the Bureau of Mines with the cooperation of the Natural Gas Department of the American Gas Association. This study is not complete; however, results of work done since preparing the paper[1] presented at the American Gas Association convention in Kansas City in May, 1937, are presented as a progress report.

In continuing the laboratory investigations the same methods and equipment were used as described in the earlier reports[1]. Hydrate decomposition curves were determined for four additional natural gases as well as for ethane and propane of higher purity than that used in determining the curves previously reported. One curve for natural gas was extended to a higher pressure. All of these curves are shown in Fig. 1. The analyses of the gases used in determining the curves are given in Table No. 1.

It will be observed from Fig. 1 that all of the hydrate decomposition curves, with the exception of the upper portion of the ethane curves B and B′, plot as straight lines on semi-log cross section paper. The natural gas hydrate decomposition curves are parallel straight lines. The failure of ethane curves B and B′ to continue as the same straight lines at their upper ends may be due to the fact that the gas is approaching liquefaction conditions. However, curves A and A′, for propane under similar conditions, do not indicate deviation from straight lines.

With the exceptions mentioned on curves B and B′, all of the curves may be represented by the empirical equation where

$T = a + b \log P$

T = temperature, degrees F.

P = pressure, lbs. per. sq. in. absolute.

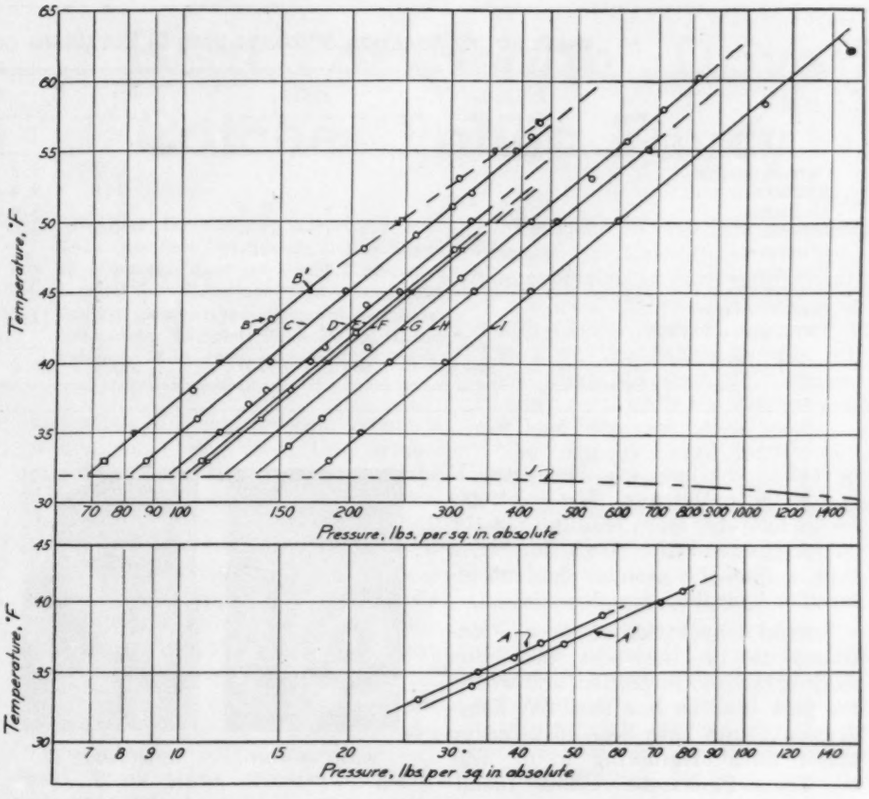
In this equation b, the slope of the line, is constant at 33.5 for all natural gases investigated, while a varies with each natural gas. The equation then becomes, for the natural gases,

$T = a + 33.5 \log P.$

The numerical values of a for the gases studied are given in Table No. 2. The variations in a are indicative of the differences in hydrate-forming characteristics, but thus far no correlation has been established between the value of a and the physical or chemical properties of the natural gas studied. The relation apparently is complicated. It will be observed that the ethane curves B and B′ also have a slope of 33.5 at their lower end, while the slope of the propane curves A and A′ is approximately 18.4. The broken line, J, shows the melting point of pure water ice as it varies with pressure. This curve was plotted from data by Bridgeman[2].

Only one natural gas has been studied at pressures above 1000 lbs. per sq. in. (curve I). The high pressure points for this curve indicate departure from the linear relation which holds at lower pressures; hence, caution should be exercised in extending any curve much beyond the range experimentally established.

The effect of "natural gasoline" on the hydrate characteristics of a gas was investigated. Hydrate decomposition curves were determined on the inlet and outlet gases of a gasoline plant. Referring to Fig. 1, curve D



A Propane 99.8%
A′ Propane 83.4%
B Ethane 97.1%
B′ Ethane 93.6%
C Natural gas, Kettleman Hills (California)
D Natural gas, Texas Panhandle, gasoline plant inlet
E Natural gas, Texas Panhandle, gasoline plant outlet
F Natural gas, Texas Panhandle,
G Natural gas, Texas Panhandle, Hammerschmidt's curve
H Natural gas, Texas Panhandle, Cliffside structure (13)
I Natural gas, Cayuga (Texas)
J Melting point of pure water ice (14)

FIG. 1. Gas hydrate decomposition curves.

[1] Deaton, W. M. and Frost, E. M. Jr., "Gas Hydrates in Natural Gas Pipe Lines." Proceedings, Natural Gas Department, American Gas Association, 1937, pp. 23-31.

[2] Bridgeman, P. W., "Water in Liquid and Five Solid Forms," Proceedings, American Academy Arts & Sciences, Vol. 47, No. 13, Jan. 1912, pp. 440-558.

TABLE NO. 1. ANALYSES OF GASES USED IN OBTAINING CURVES OF FIG. 1

	Propane		*Ethane*		*Natural Gases*						
	A	*A'*	*B*	*B'*	*C*	*D*	*E*	*F*	*G*	*H*	*I*
Carbon dioxide					0.2	0.2	0.3	0.2	0.2	0.8	0.6
Nitrogen residue		4.2			1.1	9.4	9.5	14.3	7.2	25.0	0.2
Methane			0.8	2.6	87.9	78.4	79.4	75.2	82.5	67.4	96.5
Ethane	0.2	12.4	97.1	93.6	4.4	6.0	5.8	5.9	6.0	3.7	0.9
Ethylene				3.8							
Propane	99.8	83.4	2.1		4.9	3.6	3.6	3.3	3.2	1.9	1.8
Butane, iso					0.5	0.5	0.4		0.3		
Butane, normal					1.0	1.9	1.0	1.1	0.5	1.2	
Pentane and higher									0.1		
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

is that of the inlet gas, and curve E is for the outlet gas. The inlet gas forms hydrates more readily than the outlet gas, and the conclusion from this is that the gasoline content intensifies hydrate formation.

Partial dehydration of the gas continues to be the best protection against hydrate formation, and within the past year no less than five dehydration plants have been installed on major lines originating in or near the Texas Panhandle region. Installation of dehydrating equipment has been considered for at least one other line in this area.

The Bureau, in anticipation of investigations of the effectiveness of various methods of gas dehydration, has developed a new dew-point apparatus (15), suitable for use under pressure; this has proved helpful in determining the efficiency and correct adjustment of dehydrating equipment.

In the absence of dehydration of the gas, it is recommended that, if possible, the pipe line system be operated so that at least once every few days the line pressures will be low enough to favor hydrate decomposition. Just how frequently or how long the line should be operated at reduced pressure depends a great deal on the individual line. Based on experience gained thus far, even an hour's operation at reduced pressure would be beneficial, but a longer time is recommended. Enough time should be allowed to permit any water liberated to drain into drips from which it may be blown. Emphasis is placed on the fact that as much water as possible should be drained from the line before or immediately following the repressuring of the line. Otherwise, trouble may develop again due to re-formation of hydrates. For instance, a very aggravated hydrate-forming condition may be developed if water is allowed to collect in a sag or low place in quantities sufficient to form a water seal. The gas, in blowing through this seal, continually agitates the water and increases many times the quantitative formation of hydrates. Much less severe is a condition in which the water collects in a relatively flat section of line and lies more or less quiescent in the bottom of the pipe. In this case, and assuming conditions favorable to hydrate formation, the hydrates will form in a tough flexible film on the water surface, and will tend to separate the water from the gas with the result that the quantitative rate of hydrate formation will be reduced materially.

W. M. DEATON

E. M. FROST, JR.

Hydrates often may be present in pipe lines even though their presence is not revealed by the usual operating records. One line which came to the attention of the authors was supposed by the operating engineers to be free from hydrates. Comparison of the pressure-temperature record with the hydrate curve for the gas showed that conditions were favorable to the formation of hydrates in an extended section of the line. When conditions in this section became favorable to hydrate decomposition, drips that previously had been dry began making water; and the total drip fluids increased about 600 per cent. A 25 per cent increase in efficiency was observed following the return of conditions favorable to hydrate decomposition.

Another method of relieving hydrate difficulties is the injection of inhibitors into the line. The Bureau as yet has not studied the behavior of inhibitors. This phase of the problem has had some attention by others (16), and the Bureau has confined its study to those phases of the work that have been outlined.

TABLE NO. 2. VALUES FOR "A" OF THE EQUATION FOR THE CURVES OF FIG. 1.

Curve	a *Value*
A	+6.9
A'	+6.1
B	−29.4
B'	−29.4
C	−32.1
D	−34.3
E	−35.3
F	−35.7
G	−37.6
H	−39.4
I	−42.8

■ ■

Oklahoma Northern Gas Co. Is Headed By W. J. Young

W. Jennings Young resigned, May 1, as vice-president, in charge of operation, of the Oklahoma Natural Gas Co., Tulsa, to become president of the Oklahoma Northern Gas Co., Ponca City, Okla. He succeeds D. Chris Williams, who died March 8.

The Oklahoma Northern Gas Co. distributes natural gas to Ponca City and Newkirk and supplies Covington and Kaw City with natural gas at the city gates. Mr. Young has served the Oklahoma Natural Gas Co., for 18 years. He is vice-president of the Southern Natural Gas Association, chairman of the production department, A.G.A. Natural Gas Division, and vice-president of the Oklahoma Utilities Association.

■ ■

Texas Public Service Plans Construction Program

The Texas Public Service Co., Austin, Texas, will spend approximately $251,201 during 1938, for improvements and extensions of its distribution system. The year 1938 marks the 10th anniversary of the bringing of natural gas into Austin homes by the Texas company.

"Heat For Health" Drive Catches Public Fancy

● **WILLARD G. WIEGEL, advertising manager, Lone Star Gas System, Dallas, Texas, in a paper, "Heat for Health," presented before the American Gas Association Southern-Southwestern Regional Gas Sales Conference, Adolphus Hotel, Dallas, Texas, February 16-18, 1938.—(Abstract by G A S.)**

DURING the summer of 1935, Chester L. May, executive vice-president of Community Natural Gas Co. and Texas Cities Gas Co., made an analysis of domestic customer consumption for the years 1929 to 1934, inclusive. His analysis pointed out that the average domestic customer served by Lone Star Gas System used 20 per cent less gas in 1934 than in 1929. During the six year period covered by this analysis the average customer consumption had declined each year regardless of weather conditions.

W. G. WIEGEL

For this gradual decline in customer usage two reasons were obvious. Either many customers were turning to other fuels for heating, or they were not using sufficient gas to adequately heat their homes. Investigation disclosed that not a sufficient number of customers were using other types of fuel to cause immediate concern. On the other hand, it was found that many customers had developed what we termed "the huddling habit." That is, many were heating only two or three rooms during the winter.

It was recognized that the old stand-by selling appeals, such as "gas heating for convenience," or "gas heating for comfort" are not very convincing to a customer who lives in a natural gas territory where gas heating is the rule rather than the exception. The problem was to induce that 80 per cent of the customers using space heaters to use more heat. The company's reasons had to be logical, reasonable and based on good common sense. That is why the "Heat for Health" program was inaugurated.

Dual Objective

The campaign set out to do two things. First, to make the customer recognize that a direct relationship existed between the state of his family's health during winter and adequate heat in every room in the house; second, to inform customers how to obtain the best results and greatest value from gas service.

It was stated frankly that the problem of proper ventilation and adequate heat in the home had not been given the same thoughtful attention as other phases of living.

The customers' attention to the importance of proper heating was caught with a hideously dramatic illustration of a common cold germ. It was a short step from this symbol of ill-health to a discussion of the dangerous winter illnesses that resulted from catching cold through sudden changes of temperature within the home. After the customer was interested in stopping the vicious cold germ's attack, he was given the information that would assist him to heat his home properly and healthfully.

Media used in the campaign included newspaper advertisements and news releases, poster boards, direct mail, truck signs, window displays, counter cards, gas bill imprints, radio programs. Even mailing envelopes for routine company business carried a logotype urging people to "Heat the entire home for their health's sake." One 16-page booklet and another 10-page booklet containing information about proper heating and its relationship to health were sent to customers as well as all doctors, nurses, school board members, etc. Company and departmental meetings were held and the "Heat for Health" story was told to our entire organization from top to bottom.

In one form or another during the campaign customers were given such helpful information as why more people caught cold in winter than in summer; what caused wall sweating and how to prevent it; why it was important to keep pure, fresh warm air throughout the house; why it was unhealthful to "huddle"; how much oxygen is taken from the room to support combustion of the gas used in an ordinary space heater; the importance of circulating warm air and the simple rules of heating that every home should follow to protect health. Much of the information in the campaign appealed to the customer's common sense and his love for his family.

From the standpoint of improved customer relations the "Heat for Health" program caused customers to have a greater appreciation of gas service, and the subject of proper heating of the home as an aid to health found its way into more customer conversations than ever before. The campaign improved the standing of the company and its service as a health agency with customers. The first year the campaign was introduced, high bill complaints decreased 10.4 per cent, while the average customer load increased 26 per cent.

The company closed 1937 with its average customer load back to 1931 levels which was 10,000 cu. ft. more per customer than the low point of 1934. More gas was sold during this year than at any other time during the compay's entire history.

Employee cooperation and enthusiasm was increased by the campaign because it provided employees with a new approach. It enabled employees to give concrete reasons why the customer received greater value from gas heating service.

Results

During 1935, the first year of the campaign, town plant managers went on record with the prophecy that 1936 would be the company's biggest year for the sale of heating appliances because they now had an entirely new selling approach that could be used to influence the customer in buying new equipment. As a result 1936 broke all records for heating appliance sales.

During 1935, the first year of the "Heat for Health" program, the company floor furnace sales increased 63 per cent, the second year of the campaign floor furnace sales were up 257 per cent. During the third year of the "Heat for Health" program floor furnace sales jumped 505 per cent during the 12 months' period.

There can be no doubt that customers have taken seriously the constructive information presented to them during the "Heat for Health" program. Moreover, they have been enthusiastic in their comments concerning the valuable aid the campaign has rendered. It has helped appliance merchants generally. From the best information available, dealer sales have increased substantially since the "Heat for Health" programs were started. However, it is known definitely that company heating appliance sales show that one out of every five homes on our lines has purchased some kind of heating appliance so far since the campaign started.

Use of Combination Gas-Oil Burners in Forge Furnaces

● **M. W. MARTIN and N. B. LANTZ, Public Service Company of Indiana, Indianapolis, Ind., in a paper, "A Discussion of Up-to-date Gas Forging Practices," presented before the American Gas Association Conference on Industrial Gas, William Penn Hotel, Pittsburgh, Pa., March 7 and 8, 1938. —(Abstract by G A S).**

WHEN natural gas was brought to an automobile parts plant and an industrial rate established, a combination of consistent hard work, planning, and plenty of headaches resulted in the gas conversion of the complete heat treatment department. The gas company, looking for bigger outlets for its products, then turned its attention to the forge division.

Inspirator type burners, both high and low pressure, together with diffusion or luminous flame equipment were considered. Trial applications were made, employing equipment considered to represent the best features of each of their respective classes. For a number of reasons the results obtained from these experimental applications failed to fulfill the requirements of the forge shop. The inspirator type gas conversion job produced a scale that, while relatively thin, was hard and adherent, permitting the possibility of driving scale into the forgings, thus resulting in imperfect work and decreased die life. Over heating was encountered and burnt steel produced when production rates were stepped up.

Objections Eliminated

The luminous flame application eliminated many of the objectionable features of the inspirator type burner conversion; however, for equivalent hearth areas and combustion space areas and combustion space available in standard slot furnaces, the luminous application resulted in decreased production rates, accompanied by increased fuel consumptions. Large sized forge hammers commonly carry high burden rates and fixed charges so that irrespective of relative fuel costs production rates are necessarily of extreme importance in the selection of heating equipment. The furnace must be capable of delivering properly heated steel as rapidly as the hammers can forge it.

Numerous efforts were then made to establish a condition which would retain the desirable characteristics of inspirator gas combustion and at the same time incorporate the advantages of the radiant flame. Eventually the combination gas-oil burner was selected as most nearly approaching the combustion characteristics believed to be essential.

The gas-oil burner as now designed is shown in Fig. 1. It makes use of gas burned in combination with fuel oil, approximately 80 per cent of the heat input to the furnace being supplied in the form of gas. The readily broken down, heavy hydrocarbons of the oil are surrounded by an intimate mixture of gas and air, thus furnishing adequate heat for the breakdown and subsequent transmission to the liberated carbon particles which rapidly reach incandescence. Turbulence, a feature to be avoided in conventional luminous gas flames, probably accelerates the carbon breakdown in the combination type burner.

The design of the burner emphasized simplicity of construction and easy accessibility of all integral parts. Introduction of the illuminating hydrocarbons in the form of fuel oil is through a single fixed orifice of sufficient size to reduce oil fluctuations to a minimum. High pressure gas is introduced by means of an annular opening entirely surrounding the oil spray effectively atomizing even heavy grades of oil preliminary to carbon breakdown inside the furnace. The design of the burner blocks is such as to provide high efficiency of secondary air entrainment, thereby stepping up the capacity of the burner as well as assisting in establishing desired flame characteristics. Control of oil to both burners is regulated by a single ⅜-in. special "V" opening valve. Primary air supply is controlled with a two-in. slide gate valve located adjacent to each burner.

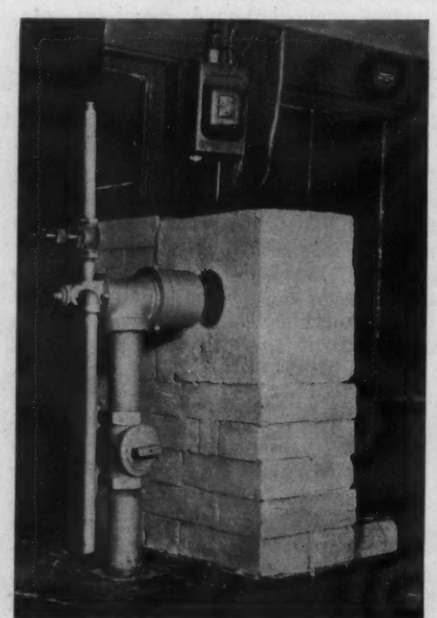


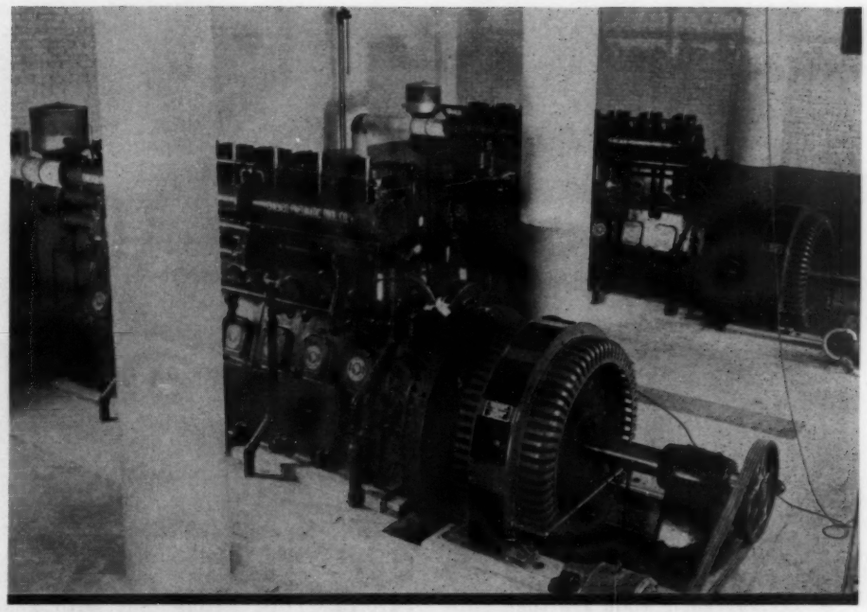
FIG. 1. Gas burner developed to burn a small portion of oil for the release of the hydrocarbons necessary to give additional luminosity when a long, luminous flame is desired.

In actual practice, natural gas was available at 25 lbs. gage pressure, consequently the design was such as to make use of the kinetic energy of the gas stream. Primary air for combustion was delivered at a pressure of approximately 12 oz. at the burner. Fuel oil available ranged from 10 to 12 degrees Baume, consequently the design considered provisions for continuity of flow when using heavy oils at low rates of flow. The size burner most commonly used has a two-in. air connection with ½-in. gas and oil connections and is capable of operating at capacities as high as 1,200 cu. ft. of natural gas plus four gals. oil per hour.

Operating Performance

Operating experiences indicate this combination type gas-oil burner has materially increased forge shop production over that formerly obtained where firing with straight oil. This is particularly significant in view of the fact that original oil-fired slot furnaces produced at higher rates of heating than any of the straight gas fired conversion applications first made. Specific operating data has not been included as a part of this paper inasmuch as forge shop practices, size and shape of parts heated, forging temperatures, etc., vary so widely in different plants. Fuel economies, heating rates, temperature distribution across the slot, uniformity of heating steel, character and amount of scale produced, simplicity of burner operation and installation and working conditions surrounding the furnace all have been developed in the field from a large number of operating installations. The results have been gratifying. A desirable and profitable gas load has been established, based upon satisfactory performance, secure from competitive fuels and again demonstrating the advantages of the form value of gas.

● **ROBERT A. RANKIN, Chicago Pneumatic Tool Co., Chicago, Ill., in a paper, "Convertible Diesel-Gas Engines," presented before the Mid-West Industrial Gas Sales Conference, Palmer House, Chicago, Ill., January 21, 1938—(Abstract by G A S).**



This engine, installed at the Armstrong Paint and Varnish Works, Chicago, is powered by gas during the five summer months, converted to Diesel fuel in the winter.

The Diesel-Gas Convertible Engine as a Load Builder

THE installation of Diesel engines convertible to gas engine operation at the Armstrong Paint and Varnish Works of Chicago, marks the opening up of a new potential for the sale of gas in the midwest area of the United States.

For many years gas companies in the Chicago area have been endeavoring to develop more and more demand for gas during the summer season with the idea of raising the summer peak of gas consumed, thus bringing the year around peak consumption to a more uniform level. The installation at the Armstrong Paint and Varnish Works is one example of achievement in this endeavor.

Working originally on the idea of installing a straight Diesel engine installation it was found that with purchased power averaging slightly under one and one-half cents per kw. hr., a Diesel installation could be amortized in approximately seven and one-half years. At this point in the negotiations the possibility of gas operated units entered into the picture, but an investigation of the prevailing gas rates availible for power generation indicated that gas engines were out of the question for year around operation.

The management of the Armstrong company, the engine company representative and the gas company representative then discussed the possibility of operating this plant on gas in the summer and oil in the winter. The problems involved in such an installation were varied, each problem peculiar to the party concerned. The major items were:

1. A suitable dump or summer gas rate which would justify the cost of convertible parts and compare favorably enough with oil costs to warrant the inconvenience of converting the engines from oil to gas in the spring and gas to oil in the fall.

2. Increased first cost of installation.

3. The furnishing of an engine which could be quickly and easily converted from gas to oil or oil to gas operation in the shortest possible period of time.

4. Engineering the installation in such a manner that the loss in horsepower resulting when the engines are converted to gas would not handicap the purchaser with lack of power generating capacity.

The first step in overcoming these problems was a new rate installed and approved by the Peoples Gas Light and Coke Co. which compared favorably with the cost of fuel oil during the five months, May, through September. With this rate to work with, a survey was made and the Armstrong officials decided to install an engine plant to operate on gas during the months in which the low gas rates were in effect and change over to oil operation during the balance of the year.

Through the cooperation of gas company and engine manufacturer engineers the engineering problems attendant on such an installation were overcome, and to date this plant has proven itself to be one of the most efficient and economical privately operated power plants in the Chicago area.

The installation at present consists of two 400 hp., 400 r.p.m., Chicago pneumatic, eight-cylinder, four-cycle, Diesel engines developing 265 kw. each, which when converted to gas operation are rated 360 hp. or 240 kw. each. The reduction in horsepower rating as gas engines is due to the fact that gas engines are operated on a lower mean effective pressure than is the case with oil engines.

Practically all convertible engines today are so arranged that to convert from oil to gas operation the only changes which must be made are as follows:

1. A spacer approximately two in. in thickness is inserted between each head and the engine frame, thus increasing the clearance between the head and piston, and reducing the compression pressure. This step is necessary because of the fact that in the Diesel engine, ignition takes place due to the heat of compression at higher pressures than are required with gas operation where ignition is accomplished by means of spark plugs. Engines of the full Diesel type operate on compression pressure ranging in the neighborhood of 500 lbs. per sq. in. with maximum pressures ranging from 650 to 700 lbs. per sq. in. whereas gas engines operate on compression pressures of from 100 to 125 lbs. per sq. in. with maximum pressures of 300 to 350 lbs. per sq. in. This pressure reduction is accomplished by increasing the clearance between the head and piston at the top of the stroke.

2. Spark plugs used for ignition on the gas engines are inserted into the spacer and the ignition wires, which are already on the engine in conduit are connected to these plugs.

3. The fuel oil injection pumps in front of each cyclinder are disconnected by the removal of a cotter pin which releases the pump plunger. The injection nozzles are then removed and openings plugged.

4. The fuel oil transfer pump which is located on the end of the engine and driven by a chain drive from the camshaft is then uncoupled and the magneto coupled in at this point.

5. The engine is equipped with a double intake manifold one for Diesel operation and one for gas operation. When the engine is to be operated on gas a blank gasket is inserted in the Diesel manifold and air then passes to the gas mixing valve.

6. Longer valve rods are then slipped in place, the governor linkage connected to the gas mixing valves and the engine is ready for gas operation.

About six hours are required to change over each of the eight-cyclinder engines. Engines of fewer number cyclinders would of course require a correspondingly lesser time. The practice at the Armstrong Paint and Varnish Works has been to change the units over on week-ends, converting one unit at a time, on successive week-ends, since the nature of their load requires one engine in operation at all times and this method permits of changeovers together with necessary adjustments, testing, etc., without interruption of service.

Comparative Ratings

Mention has been made of the fact that the engines are rated approximately 10 per cent less as gas engines than as Diesel engines. The lower rating on gas is due to the fact that Diesel engines can be and are operated with mean effective pressures up to 80 lbs. per sq. in. whereas in gas engine operation 70 to 72 lbs. per sq. in. mean effective pressures are considered the peak in good engineering practice.

This loss in engine capacity can be overcome by replacing the liners and pistons used when operating on oil with liners and pistons of larger diameter thus increasing the cyclinder volume for gas operation. The objections of larger liners and pistons are twofold.

1. The first cost of an extra complete set of pistons and liners usually runs into so much money that it is impossible to justify the extra investment against the saving in gas operation.

2. The time required to convert an engine when it becomes necessary to change pistons and liners usually is longer than any industrial plant can afford to be without power.

For these two reasons it is customary to sacrifice some horse-power in the interest of economy both in time and money and since most plants are engineered with some excess capacity this loss in available horsepower is seldom serious.

As representative of the comparison of fuel costs there were taken for gas, the operating records for the month of August 1937, and for oil the records for the month of October 1937.

Total kw. hrs. generated during August was 127,500, using 26,617.6 therms of gas at a total cost of $610.15. This, means that with gas costing an average of 2.29 cents per therm, cost of gas per kw. hr. produced is 4.79 mills per kw.

From the records on fuel oil operation for October, 130,000 kw. hrs. were generated using 13,970 gals. of oil at 5.896 cents per gal. or a total cost of $823.67. From these figures the cost of fuel oil per kw. hr. produced was 6.33 mills per kw.

From the above it can be seen that operating on gas there is a saving of 1.54 mills per kw. hrs. produced over cost of oil.

Based on an average generation of 125,000 kw. hrs. per month and the operation on gas for a five month period each year, the resultant savings in gas cost as compared to oil cost amounts to approximately $962.50 per year.

Advantages of Gas

There are several other points of advantage in favor of the gas as compared to the Diesel engine. When the engine which has been designed to operate on the high pressures common to Diesel operation is changed over to gas operation, the much lower pressures used in gas engine operation means that the working parts of the engine such as bearings, crankshaft, valve mechanism, pistons, cylinders, rings, etc. are subjected to much lower stresses and because of this the cost of maintenance in a gas engine plant is considerably less than is true of the Diesel Plant. Also, when an engine is operating on gas, the fuel oil injection pumps and fuel oil injection nozzles are not in use, and those are two of the most costly parts in Diesel engine operation and maintenance.

Another application where the gas engine shows to advantage over the Diesel is the heat recovery obtained from the jacket circulating water and from the exhaust gases. With this heat many plants supply their needs for hot water or low pressure steam in process work as well as for building heating requirements. While it is true that little or no building heating is required in the summer months, in those plants using hot water or steam for process work, the gas engine again shows to advantage over the oil engine due to the higher exhaust and jacket temperatures encountered.

CALENDAR

June, 1938

A. G. A. Home Service Conference and Training Course—Hotel Muehlebach, Kansas City, Mo., June 7-10.

Canadian Gas Association—31st Annual Convention, Royal York Hotel, Toronto, Ont., Canada, June 9-10.

Danish Gas Association—Allings-Sandvig, Denmark, June 15-17.

Pacific Coast Gas Association, Northwest Conference—Portland, Ore., June 16-17.

Society of Chemical Industry, Annual Meeting of all Sections—Ottawa, Canada, June 20-22.

New England Gas Association Sales Conference—Viking Hotel, Newport, R. I., June 23-24.

American Home Economics Association—William Penn Hotel, Pittsburgh, Pa., June 28- July 1.

July, 1938

Michigan Gas Association—Grand Hotel, Mackinac Island, Mich., July 5-7.

West Virginia Oil and Natural Gas Association—Charleston, W. Va., July 27-28.

September, 1938

Pacific Coast Gas Association—45th Annual Convention, Santa Barbara Biltmore Hotel, Santa Barbara, Calif. Sept. 14-16.

October, 1938

A. G. A. Twentieth Annual Convention—Atlantic City, N. J., week of October 10.

National Hotel Exposition—Grand Central Palace, New York, N. Y., Oct. 24-28.

December, 1938

National Exposition of Power and Mechanical Engineering—Grand Central Palace, New York, N. Y., December 5-10.

Pennsylvania Gas Association Elects Mensch as President

At the 30th annual convention of the Pennsylvania Gas Association, held May 3-5, in Skytop, Pa., E. E. Mensch of Williamsport was elected president during the closing business session, May 5. Mr. Mensch succeeds Howard S. Christman, retiring president.

Keenan Has New Appointment

Dan S. Keenan, of the United Carbon Co., Charleston, W. Va., on May 1, took over the duties of his newly created position as vice-president of the Carnegie Natural Gas Co., Pittsburgh, Pa., company officials recently announced.

Childress Is New Laclede Gas Light President

L. WADE CHILDRESS, chairman of the board of the Columbia Terminals Co., was elected president of The Laclede Gas Light Co., St. Louis, Mo., on May 10, succeeding Joseph B. Wilson, who resigned April 20.

L. W. CHILDRESS

B. F. Pickard was re-elected operating vice - president; E. L. White, secretary-treasurer; and Alfred Hirsh, assistant secretary-treasurer. William C. D'Arcy, president of the William C. D'Arcy Advertising Co. of St. Louis and a member of the board, was elected a member of the executive committee which now includes Childress, M. E. Fiewell, Chicago, A. L. Jackson, New York, E. E. Pershall and A. L. Shapleigh, St. Louis. Childress was chairman of the executive committee at the time of his recent election. No successor as chairman has been selected.

■ ■

W. P. Hand Promoted By Southern California Company

Personnel changes in Southern California Gas Company during April included the appointment of W. P. Hand, former district agent in San Bernardino, to the position of assistant manager of the company's Eastern Division, headquarters of which is at San Bernardino.

R. T. McFadden, who served as district agent in Redlands, succeeds Hand as San Bernardino district agent, and V. C. Pack of the Los Angeles office takes McFadden's place in Redlands.

Hand has been with the Southern California Gas Co. for the last 12 years. McFadden was employed in 1931, and Pack in 1932.

■ ■

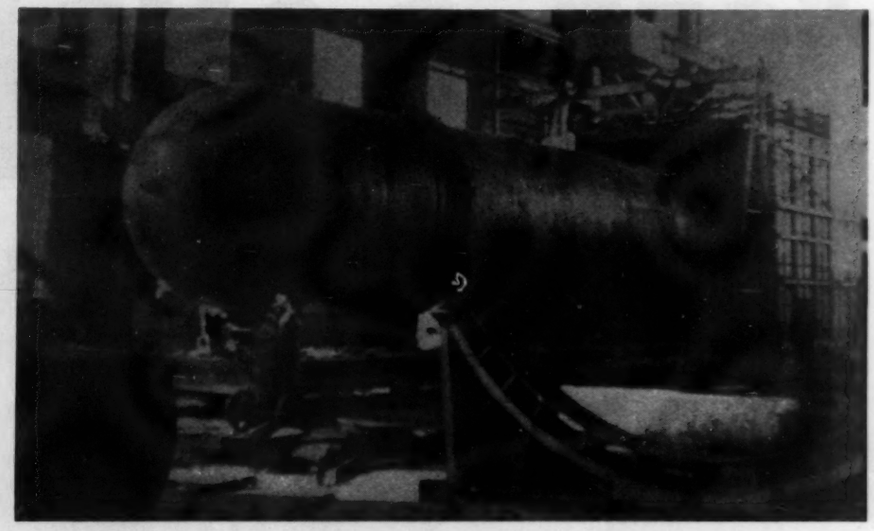
Middlesboro Gas Franchise Sold to William Moore

The city commissioners of Middlesboro, Ky., have just sold a 20-year natural gas franchise for the city to William Moore and associates, of Corbin, for $100. Mr. Moore has declared that as soon as he receives a construction permit from the State of Kentucky, the laying of gas mains in Middlesboro and the construction of pipe line to carry natural gas from wells at Himyar, Knox county, to the city will be started. According to Mr. Moore, Middlesboro consumers should receive natural gas within six months.

■ ■

McCarter Medal Awarded

Claude R. Arnett, gas department, West Penn Public Service Co., Fairmount, W. Va., has been awarded the American Gas Association's McCarter Medal for his quick action in saving the life of Guy Toothman, also a company employe. Arnett successfully resuscitated Toothman after the latter had been overcome by escaping gas in a trench the two had dug to make a gas connection.



One of Southern Counties Gas Company's new all welded holders in the normalizing furnace of Western Pipe and Steel Co., Los Angeles.

California Co. to Install Three All-Welded Gas Holders

NEARING completion in the Los Angeles plant of Western Pipe and Steel Co. are three steel pressure vessels, 78 ft. long by 10½ ft. in diameter, which will be installed at the Santa Barbara holder station of Southern Counties Gas Co. to provide auxiliary storage capacity for the Santa Barbara distribution system. The three holders will have a total net capacity of 200,000 cu. ft. of gas under a maximum pressure of 167 lbs., which will be immediately and automatically available in case of emergency.

An interesting feature is the all-welded construction of the holders. This represents a departure in high pressure holder design and construction in the Southern Counties' gas system, where all similar holders are riveted. All-welded construction is economically practicable only when heat treating may be applied to relieve localized stresses set up by the heat of welding. This requires a design that will permit the holders to be completely fabricated in the manufacturer's plant, the size of each unit being limited by the capacity of Western Pipe and Steel company's gas-fired normalizing furnaces.

Principal gain in this type of construction is lower cost. Thus the cost of this storage (cost of shell erected on foundation furnished by buyer) per M c.f. of net capacity is $115 as compared with a corresponding cost of $143 per M c.f. for a field erected riveted shell of 250 M net capacity built in 1937.

The manufacturer will subject each vessel to a hydrostatic test pressure equal to one and one-half times the maximum working pressure, and also before shipment, spray the outer surface with zinc in lieu of painting. The cost of metal spraying a vessel under shop conditions is much lower than in the field and the longer life of this type of protective coating yields an annual cost which compares quite favorably with painting.

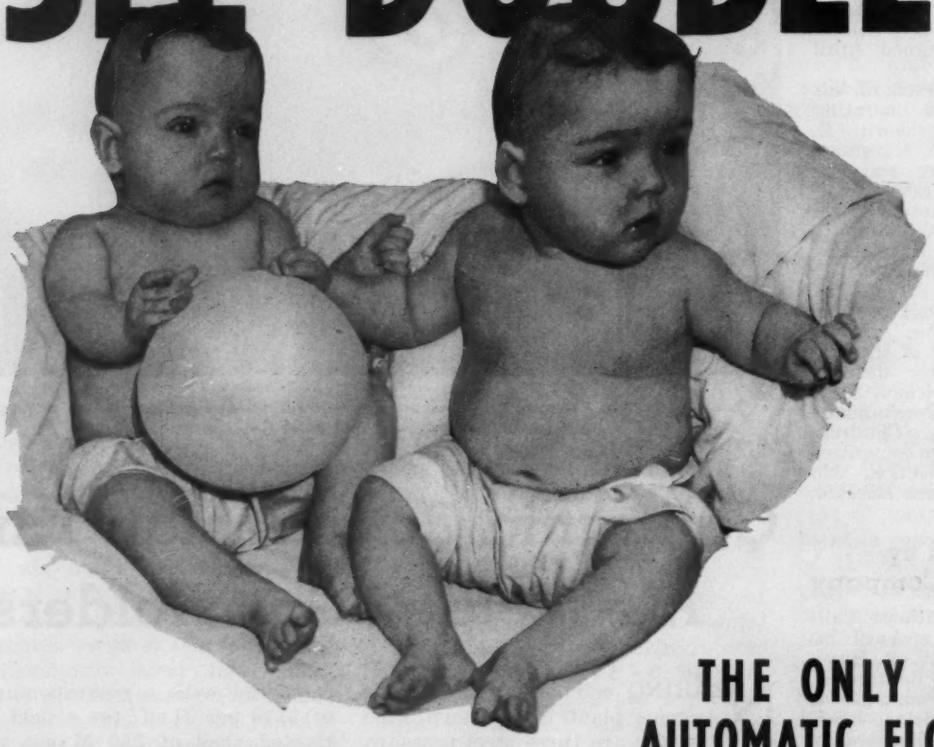
The natural gas distribution system in Santa Barbara is being further reinforced this year by the installation of two gas engine driven compressor units to replace old steam operated equipment. These compressors will have a total capacity of 200,000 cu. ft. of gas per hour, and will be used to pump gas from the existing low pressure storage holders into the distribution mains.

■ ■

Ohio Fuel Gas Gets Contract

The city council of Columbus, Ohio last month granted the Ohio Fuel Gas Co. a five year gas rate contract to supply natural gas. The contract replaces a former agreement which expired May 6. Gas will be served at existing rates for four years, except for reductions granted large consumers.

"SEE DOUBLE" IN



A WARD FURNACE helped save their lives!

Here are Martha and Marie, twin daughters of Mr. and Mrs. Gore, of 1310 West 81st Place, Los Angeles, Calif. They were born early last fall... prematurely, at six months. They weighed only two pounds each! When they were taken from the hospital incubator . . . the doctor said they would die unless the temperature of their room were kept at an exact level prescribed. The gas company recommended that the safety of these frail newcomers be entrusted to a WARD FLOOR FURNACE . . . which would gently circulate clean, warm air . . . its temperature accurately regulated by WARD'S Bilt-in Thermo-Control. The doctor agreed. And you can see how well the WARD performed. Mr. and Mrs. Gore are enthusiastic for WARDS. They are one family out of 350,000 satisfied WARD users.

THE ONLY COMPLETELY AUTOMATIC FLOOR FURNACE

There are other floor furnaces, of course . . . but WARD is the only completely automatic floor furnace.

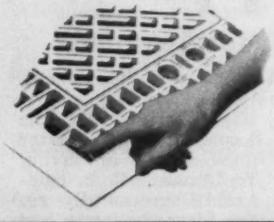
WARDS are constructed in a sturdy "complete package." All controls and accessories are built in. There are no external parts, no wires, no fragile connections. Installation is easy. The complete furnace is dropped into the floor opening, quickly connected to vent and gas line. Takes no space . . . register at floor level is all that is seen in the room.

Automatic features of the furnace include:

WARD-perfected Pilot . . . proved by many tests to be unusually sensitive and swift in action, automatically stopping gas flow should flame be extinguished.

Bilt-in Thermo-Control—a thermostat that is part of the furnace. Regulator in corner of register. Gives amazingly accurate temperature control since it contacts all the room air as it circulates through furnace.

WARD Cradle Circulator draws the room air automatically, smoothly, gently through the furnace three to six times an hour, increasing efficiency as much as 20% . . . reducing gas consumption through greater efficiency.



YOUR LOAD IS AS GOOD AS THE APPLIANCE YOU SELL

HEATING PROFIT

WITH THESE TWIN ADVANTAGES OF WARD FLOOR FURNACES

1 WARD FURNACES WILL SHOW AN EXCELLENT PROFIT IN YOUR MERCHANDISING DEPARTMENT

2 WARD FURNACES WILL ADD TO YOUR LOAD PROFIT WITH PROOF THAT GAS IS BEST FOR HEATING

Don't miss these double advantages of WARD heating equipment. Profit, as so many other utilities are profiting, from the load-building possibilities of WARD FLOOR FURNACES on your lines.

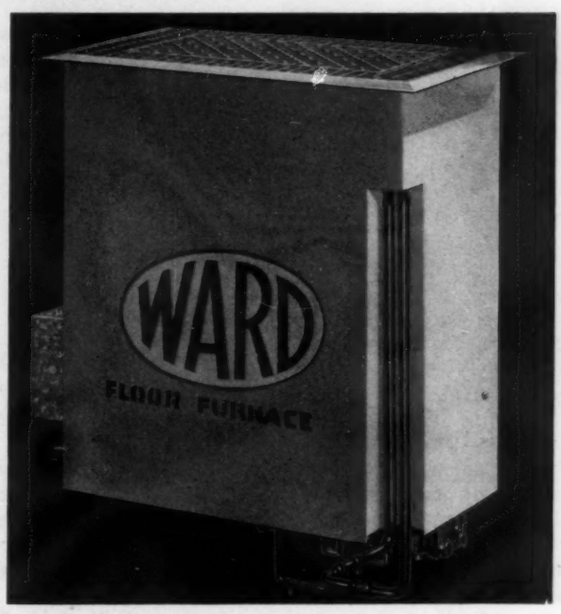
There is a big market in your community for these popular, completely automatic heating appliances.

You'll find that market in homes where WARD'S efficient, vented warmth will make pleased, permanent consumers of your gas. They're permanent because WARDS are permanent. Once in, WARDS stay put. Guaranteed for ten years, they usually outlast the house itself.

You'll find that market, too, in hard-to-heat commercial establishments . . . one-story shops, stores, offices. Don't overlook load-building possibilities in that direction.

The 1938 WARD FLOOR FURNACE is built of the best materials (Toncan iron, for instance) with all the efficiency that our 29 years of furnace building can put into it. It is an appliance you can install with confidence and have on your lines with pride.

May we tell you more? Why not write for full details . . . with catalog and price list.



Would you like our new Service Manual on how floor furnaces should be installed? We'll be glad to send you a copy on request.

WARD HEATER COMPANY

LOS ANGELES, CALIFORNIA

COMPLIES WITH NATIONAL SAFETY REQUIREMENTS · AMERICAN GAS ASSOCIATION · APPROVED

SELL THE BEST....SELL WARD FLOOR FURNACES

Indiana Gas Association Holds 28th Convention

GAS STAFF REPORT

AT THE Twenty-eighth Annual Convention of the Indiana Gas Association held at Gary, May 16-17, Dean H. Mitchell, Northern Indiana Public Service Co., Hammond, was elected president; Paul A. McLeod, Public Service Co. of Indiana, New Castle, former secretary - treasurer, vice-president, and H. Wayne Thornburg, Central Indiana Gas Co., Anderson, secretary-treasurer. Directors elected were L. B. Schiesz, Northern Indiana Power Co., Indianapolis; H. V. Armstrong, Indiana Gas Utilities Co., Terre Haute, and C. B. Grief, Gary Heat, Light & Power Co., Gary. Attendance was the best in the history of the Association, totaling 416 registrations including 34 ladies.

D. H. MITCHELL

H. Carl Wolf, Central Indiana Gas Co., Muncie, in his presidential address reported total revenues of member companies for the year 1937 were $15,305,648.50 an increase of 8 per cent over 1936. Total customers were 352,463 an increase of 4 per cent. The number of central heating customers increased 24 per cent and total merchandise sales increased 41.1 per cent amounting to $2,816,558.00 and representing the sale of one modern major gas appliance to every tenth customer. Unaccounted for gas was reduced 24 per cent.

L. L. Bomberger, president, Indiana State Bar Association, Hammond, speaking at the annual banquet warned of the threats to personal liberty in present governmental trends and advocated as a safeguard the removal of the courts from political control.

An effective presentation of the C. P. range was given by Carl Sorby, George D. Roper Corp., who described and demonstrated its greater efficiency and convenience. Bernard T. Franck, Grand Rapids Gas Light Co., in his address on "Home Service" told of its functions and its practical effectiveness under the direction of the sales department.

Other speakers were Prof. R. J. Greenlea, Purdue University, "Employe Education;" E. D. Bivens, Ohio Fuel Gas Co., Columbus, Ohio, "The Way out;" Fred C. Armbruster, Middle West Service Co., Chicago, "Gas Load Building with Water Heating;" Dr. John L. Bray, Purdue University, "Gas Engineering Activities at Purdue;" Prof. Irving J. Lee, Northwestern University, "The Persuasive Speech;" and Dr. Daniel Starch, New York, "Gas — Is the Horse Dead or the Rider?"

C. V. Sorenson held a symposium on appliance selling in the commercial section. Herman Horstman, Indianapolis, presided at the technical section meeting at which the speakers were R. A. Gallagher, Public Service Co. of Indiana, Indianapolis; E. W. Christell, Peoples Gas, Light and Coke Co., Chicago; and H. T. East, Public Service Co. of Northern Illinois, Oak Park. The accounting section under the chairmanship of D. P. Pardee, Indianapolis, held a symposium on problems and ramifications of the new uniform classification of accounts.

One of the most interesting features of the program was a skit entitled "Gold in the Gas Range" presented by talented employes of the Gary Heat, Light & Water Co.

Mrs. James C. Sackman, Hammond, was chairman of the ladies entertainment committee.

N.Y.-N.J. Sales Conference Attracts 375 Delegates

GAS STAFF REPORT

IN his keynote address to the New York-New Jersey Regional Gas Sales Conference held in New York May 18-19, E. L. Jeffe, vice president of the Consolidated Edison Co., stated that, after his own company's experiences with both gas and electric cookery, gas cookery is secure. "Those of us," said Mr. Jeffe, "who have made a sound study of the situation . . . . . are rather firmly convinced that the field of domestic cooking rests safely and securely in the lap of the gas industry except under extraordinary conditions. We challenge proof of the economics of so many of the highly promotional activities now in motion for electric cooking."

Wm. J. Schmidt, Long Island Lighting Co., as chairman of the Regional Council, presided at the opening session, total registrations for the conference being 375.

Merrill N. Davis, president. A.G.A. E.M., told of the work of Gas Exhibits Inc. and described the fine job it has done in "gasifying" the New York World's Fair.

R. S. Agee, sales promotion manager, A.G.A.E.M., offered the C.P. Range as a powerful weapon to offset the declining domestic revenues in both the manufactured and natural gas fields. The utilities had asked for the C.P. Range, and drawn up its specifications, the manufacturers are making it available, and it is now up to the utilities to put it over. Mr. Agee described the promotional material that will soon be available.

In addition to the M.G.M. films "Penny Wisdom" and "Penny's Party," the G. E. Film "The right and wrong way to sell," and "The Story of a House," were shown. Speakers were F. W. Williams, "The A.G.A. Liberty Home;" B. Andrews, Street Railways Advertising Co., New York, "Promotion as keynote to successful sales;" Dr. H. W. Hepner, Syracuse University, "Customer Relations;" Flora G. Dowler, Binghamton Gas Works, Binghamton, "Home service aids to water heater sales;" J. P. Leinroth, Public Service Electric & Gas Co., Newark, "Selling to new homes;" T. W. Halloran, N. Y. Power & Light Corp., Albany, "Selling automatic water heating to low income market;" and Lyle C. Harvey, president, The Bryant Heater Co. Cleveland, "Join the swing to gas." G. F. B. Owens, new business manager, The Brooklyn Union Gas Co., presented a clever skit entitled "Making a water heater sale." The Thursday luncheon was enlivened by a puppet show entitled "Handy McSaver" given by Lyda Flanders, Worcester Gas Light Co., Worcester, Mass.

..and of course

PAYNEHEAT

In its new Beverly Hills store, Saks Fifth Avenue was careful to provide every feature that could possibly add to the comfort of a distinguished clientele . . . a brilliant exterior, the finest of fixtures and furnishings, the exclusive merchandise which is a Saks tradition . . . and of course, PAYNEHEAT.

In fine buildings and homes everywhere, Payneheat, through its efficiency and economy, is constantly proving the wisdom of specifying GAS.

Made in America's most modern furnace plant, Payne Furnaces are the magnificent result of 25 years of concentration on gas-fired appliances exclusively.

THE IDEAL FUEL GAS

FLOOR FURNACES - DUPLEX REGISTER FURNACES
UNIT FURNACES - CONSOLES - FORCED AIR UNITS
WINTER AIR CONDITIONING EQUIPMENT

Payne

FURNACE & SUPPLY CO., INC.
BEVERLY HILLS • CALIFORNIA

P. C. G. A. Holds Northwest Conference This Month

THE Northwest Conference of the Pacific Coast Gas Association will be held June 16 and 17 in the auditorium of the Pacific Service Building in Portland, Ore. Clifford Johnstone, San Francisco, is managing director of the Pacific Association.

R. E. FISHER

Honorable Joseph K. Carson, Mayor of Portland, will open the conference at 10:00 a.m. with a welcoming speech "The Value of the Gas Company to Portland." He will be followed by Norman R. McKee, president of the Pacific Coast Gas Association who will speak on "What the Association is Doing." R. E. Fisher, chairman, will speak on "The Golden Gate International Exposition and the Gas Industry." "Crystal Gazing—The National Outlook" is the subject of the talk by James F. Pollard, president of the Seattle Gas Co.

Afternoon sessions will be devoted to a series of meetings considering the problems of gas advertising and selling. "National Advertising and Local Tie-In" will be discussed by Vernon Churchill of McCann-Erickson, Inc., followed by discussions of cooperative newspaper advertising by R. B. Elliott of Portland Gas and Coke Co., and N. O. Fratt of Seattle Gas Co.

Cooperative merchandising will be discussed by A. F. Rice, market development manager, Southern California Gas Co. R. L. Levy, president, Gas Appliance Society of Oregon, and J. King Bryon, managing director of Furniture Dealers Association of Oregon, will present talks on "The Dealer Viewpoint." Ella Lehr of Botsford, Constantine & Gardner will have as her topic, "Home Service as the Newspapers See It."

J. J. Winn, Jr., commercial manager, Portland Gas and Coke Co., will act as chairman of these afternoon sessions.

Friday morning meetings are under the charimanship of N. H. Wardale, and will open with a discussion of "Maintenance of Liquid Purification Equipment and Some Operating Wrinkles," by J. F. Sauer, division superintendent, Pacific Gas and Electric Co., Marysville. F. C. Hawks, general superintendent, Washington Gas and Electric Company will speak on "What it Costs to Manufacture Gas." "Building Load with Gas Engines" is the subject of a talk by Williard F. Suess, supervisor, Gas Power Sales of Southern California Gas Co. F. O. Suffron, supervisor, Pacific Coast Branch A.G.A. Testing Laboratories will present "What's New in Appliances."

At the Conference luncheon at the Portland Hotel, R. B. Ambrose, president, Columbia Empire Industries, will be a featured speaker, his topic being, "The Northwest."

George Mackenzie will act as chairman of the Friday afternoon session. George W. Smith, district manager, Southern Counties Gas Co., Santa Barbara, will talk on "Making and Using a Customer Survey." R. E. Fisher, vice president in charge of Sales and Public Relations, Pacific Gas and Electric Co., will speak on "Improving Customer Contacts." Following Mr. Fisher will be a period devoted to discussion, in which R. M. Thomas, Northwest Cities Gas Co., P. R. Dunbar, Seattle Gas Co., and E. J. Ludeman, Washington Gas and Electric Co., will present their subjects for discussion.

Cooperation, Sales Promotion are Topics at A.G.A.E.M. Convention

LEADING manufacturers from all sections of the country heard President Merrill N. Davis in addressing the annual convention of the Association of Gas Appliance and Equipment Manufacturers, White Sulphur Springs, W. Va., urge greater sales effort toward the replacement of obsolete equipment in homes as a means of opening selling markets, of giving industry a strong normal stimulus and of making possible a great saving for those investing in modern appliances. Many well known executives from manufacturers, pipe line companies, and operating utilities were heard during the three day meeting, May 25-27.

M. N. DAVIS

A featured speaker on the convention program was N. C. McGowen, president, American Gas Association, who made a plea for constant cooperation between operating gas companies and the manufacturers in order to best serve the public interest. Hugh Cuthrell, president, Gas Exhibits, Inc., in discussing the New York world's fair reported that 150 gas appliances are now in actual operation on the Fair grounds with an average monthly consumption of five million cu. ft. Service extensions for gas for all purposes have been completed in 20 exhibitors' buildings.

Other general sessions speakers were Alexander Forward, A.G.A. managing director; W. E. Derwent, chairman, Domestic Range Division, who spoke on "The C. P. Gas Range Program." Sales in 1938 of refrigerators, water heaters, and house heating equipment were discussed respectively by F. E. Sellman, chairman, Gas Refrigerator Division, H. N. Ramsey, president, Welsbach Co., and H. P. Mueller, chairman, Gas House Heating and Air-Conditioning Equipment Division. R. G. Logue, vice president, Ward Heater Co., reported on Pacific Coast manufacturers activities.

Bruce Barton of New York and Bruce A. Wilson, director Division of Education, F. H. A., were head line speakers on the convention's general sessions during the convention meetings.

■ ■

Geary, Okla., Will Receive Natural Gas In October

The White Gas and Fuel Co., Sayre, Okla., has been granted a 25-year franchise to serve natural gas in Geary, Okla. The franchise was granted following a special election, March 22, when Geary citizens voted 269 to 22 in favor of the installation of a gas distribution system.

The White Co. will pipe gas from the Consolidated Utilities Co. mains west of Watonga to establish the Geary service. The franchise specifies that the gas system shall be complete and ready for service before October 1, 1938. White Gas and Fuel is also supplying natural gas to Sweetwater and Delhi, Okla.

■ ■

Gas Is Encountered In Henderson County, Ky.

In the northeast part of Henderson County, Ky., a test on the C. T. Blackwell farm has encountered 500,000 cu. ft. of gas in the Jones sand at 1538 ft. It is reported that drilling will be continued as soon as the gas is cased off.

■ ■

Kuhlmeier Dies at Home

Lester Kuhlmeier, office manager for the Consolidated Gas Utilities Corp., Oklahoma City, was stricken with a heart attack and died at his home on April 29.

BETTER GAS CONTROL

boils down to THIS SIMPLE DISC

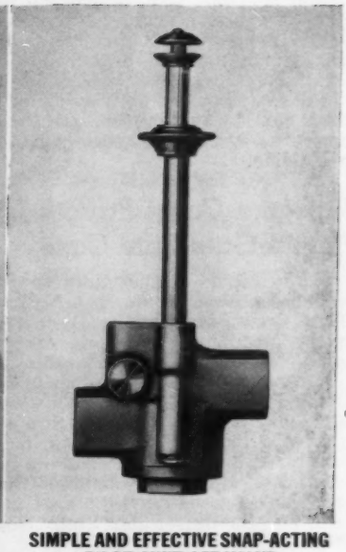
The big difference between Klixon Gas Controls and all others is a small yet simple snap-acting disc—the Spencer Thermostatic Disc. Instead of bellows, toggles, magnets, relays, or other complicated parts, all Klixon Controls use this simple, dependable bimetal disc as chief operating device. And that is why you get less trouble with Klixon Controls—no bother from vibration, no radio interference, and no maintenance on worn-out mechanical or electrical parts. That is why gas companies find it easy and profitable to install and service these Klixon Snap-acting Controls.

QUIET ELECTRICALLY OPERATED GAS VALVE

No humming, no chattering, no sticking with this Klixon electrically operated gas valve. It's thermally actuated—but not affected by ambient conditions. It is positive in operation. Is easy to install. Line or low voltage. Is run by Klixon or any other thermostat. Capacities up to 195,000 B.T.U. Sizes up to ¾" I.P.S.

SMALL—STEADY—SNAP-ACTING

Klixon Room Thermostats are compact, modern, attractive. No complicated parts. Just the disc. Dustproof. No exposed live parts. Actuated by gas or electricity. Easy to install. Special suspended mounting saves 8 to 12 dollars on unit heaters. Comes with or without thermometer. Several finishes.



SIMPLE AND EFFECTIVE SNAP-ACTING PILOT SHUT-OFF VALVE

No packing glands, the Klixon disc acts directly on the valve. Available in wide variety of body styles to meet all application requirements for natural, manufactured and bottled gases. Makes available the well-known Klixon shut-off valve for all types of gas appliances. Low price.

SEND FOR THIS COMPLETE CATALOG NOW

KLIXON
TRADE MARK REG. U.S. PAT OFF.

Before specifying or installing any more controls for gas heating appliances, send for this complete catalog of all Klixon Snap-acting Controls. Complete information, including diagrams, recommendations, and prices are given in this 40-page, fully illustrated book. Write for your free copy today.

SPENCER THERMOSTAT CO., 706 FOREST ST., ATTLEBORO, MASS.

H. M. Crawford, P. G. and E. Sales Executive, Succumbs

HUBERT M. CRAWFORD, general sales manager, Pacific Gas and Electric Co., San Francisco, died from a heart attack at his summer home on the Russian River in Forest Hills, Sonoma County, on Sunday, May 29. He was 53 years old.

H. M. CRAWFORD

His passing was a tremendous shock as he had apparently been in excellent health and had been at regular attendance during the week at the sessions of the Pacific Coast Electrical Association in San Francisco and had recently attended the Natural Gas Convention in New Orleans.

Crawford was born in Nebraska, and was a graduate of the Electrical Enginering School of the University of Nebraska. His first utility job after coming to California was commercial manager of the Bakersfield district of San Joaquin Light and Power Corp. He joined the Pacific Gas and Electric Co. 25 years ago.

Mr. Crawford has been a member of the Pacific Coast Gas Association for the past 20 years, serving as president in 1936. He is a past president of the Sales Managers Association of San Francisco. For many years he was instructor in salesmanship in University of California extension courses, and was regarded as one of the most capable men in his line.

■ ■

Supreme Court Favors Lone Star in Gate Rate Case

The United States Supreme Court rendered a decision, on May 16, in favor of the Lone Star Gas Co., Dallas, Texas, in the company's gate rate case which has been pending for six years.

In 1932 the case was opened by the Texas Railroad Commission, which ordered a reduction in Lone Star's rates from 40c per 1000 cu. ft. to 32c. The district court jury in Austin, Texas, overturned this order, holding that the reduction was unreasonable. Upon appeal by the State, the State Court of Civil Appeals reversed the verdict and judgment of the lower court. The federal Supreme Court held that the State Civil Appeals Court had no grounds for overturning the verdict. The Court held that the gas company had by appropriate evidence shown the Commission's order to be confiscatory, that the jury, which tried the facts, had so found, and that under the state practice the Court of Civil Appeals was not empowered to substitute its findings for the jury's.

■ ■

Brooklyn Navy Yard Installs 17 New Gas Furnaces

The Brooklyn Navy Yard, N. Y., has recently completed the installation of 17 gas-fired furnaces in the yard Forge Shop, which handles all forging for the navy. The furnaces, which were especially designed by Arnold Sutermeister of the Navy Yard's New Business Department, are used for various forging operations. The new installation is expected to increase the yard's gas load over the 1937 record when more than 18,000,000 cu. ft. were sold to the Brooklyn Navy Yard.

■ ■

Canadian Gas Association Convenes This Month

Meeting June 9-10, the Canadian Gas Association will hold its 31st annual convention at the Royal York Hotel, Toronto, Canada. The convention program, which will be divided into three general sessions, has been planned by J. D. Von Maur, committee chairman.

Papers to be presented to the convention include: "Combustion Characteristics of Various Gases When Used in Customers' Appliances," John Keillor, Vancouver; "Water Heating with Gas," G. S. Dawson, Vancouver; "House Heating with Gas," H. B. Johns, Chicago; "Kitchen Gas Appliances," H. E. G. Watson, Toronto; "Water Heating with Gas," Frank D. Howell, Brantford, Ontario; "Distribution," Erick Larson, Corpus Christi, Texas; "Devices for Detecting Gas Leakage," P. W. Geldard, Toronto; "The Value of Gas in Industry," R. F. Mann, Kenmore, N. Y. A special address will be presented by Merrill N. Davis, A.G.A.E.M. president.

■ ■

New Gas Resources Found In Oklahoma Fields

A new gas and oil pool was opened in Murray county, Okla., when the Gilbreath and Dutton No. 1 Wolfe, north of Davis, blew in for a gas well May 23. Engineers of the Lone Star Gas Co. gaged the well at 36,300,000 cubic feet a day with rock pressure of 942 lbs.

The second new oil and gas field for Payne county, Okla., since the first of the year showing May 23, in tests of the Texas Co. No. 1 Longan, near Goodnight.

The test showed 35 to 40 barrels of oil with 10,000,000 ft. of gas per day. The production is from a plug-back depth of 4,956 feet.

No. 1 Bugher, south of Noble, Cleveland county, showed an average of 5,500,000 cu. ft. of gas per day.

■ ■

Dyer Has New Post With Community Natural Gas

Hal L. Dyer, has recently been appointed manager of the Seymour district, Community Natural Gas Co., Dallas, Texas, according to an announcement by L. B. Denning, Jr., vice-president and operating manager of Community Natural Gas and Texas Cities Gas Co. Mr. Dyer for six and a half years acted as manager of Community Natural's Cisco district. He is succeeded in Cisco by Cornelius M. Nevill, formerly assistant manager of the Waxahachie district of Community Natural.

■ ■

Pipe Line Levies Reduced

The Louisiana Tax Commission has recently ordered an eight per cent reduction in assessments on oil and gas pipe lines in that state.

Wittmer Heads Consolidated Edison Personnel Dept.

CONSOLIDATED Edison Co. of New York, Inc., announced the appointment of Dr. J. J. Wittmer, medical director, as director of the company's personnel department, following the retirement of Col. J. P. Jackson from that position. Dr. Wittmer retains supervision of the medical department which is now a part of the personnel. The new organization, which became effective April 1, is supervised by Vice-President John Stilwell.

Dr. Wittmer is assisted in his new position by two assistant personnel directors, D. S. Sargent and H. E. Nesbitt, and two assistant medical directors, Dr. R. C. Kimball and Dr. N. E. Eckelberry. M. D. Smith, manager, personnel bureau, New York and Queens Electric Light and Power Co., and H. M. Cook, manager, personnel bureau, Brooklyn Edison Co., also report to Dr. Wittmer.

■ ■

Wisconsin Utilities Ass'n Elects New Officers

In the annual mail ballot voted by the membership of the Wisconsin Utilities Association in April, Bruno Rahn, vice-president and general manager of the Milwaukee Gas Light Co., was unanimously elected association president, effective May 1. He succeeds C. E. Kohlhepp, who, as retiring president, becomes chairman of the Advisory Committee. Mr. Rahn, who has been associated with the gas industry since 1909, was president of the old Wisconsin Gas Association in 1921.

A. P. Gale, executive vice-president, Wisconsin Power and Light Co., Madison, is the newly elected association vice-president, succeeding Mr. Rahn, and John Dockendorf, assistant research engineer of the Milwaukee Electric Railway and Light Co., is treasurer.

■ ■

School Acquaints Rio Vista Women With Gas Service

A "cooking" school that included demonstration and instruction in the use of gas heating and water heating equipment as well as gas ranges, was recently held at the Rio Vista Women's Improvement Club in Rio Vista, Calif., April 25.

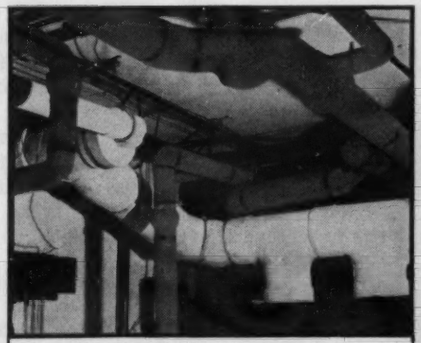
Pacific Gas and Electric Co. started service of natural gas in Rio Vista about April 15, and their dealer representatives and appliance counsellor took this occasion to demonstrate the use of these appliances. About 165 women were in attendance.

■ ■

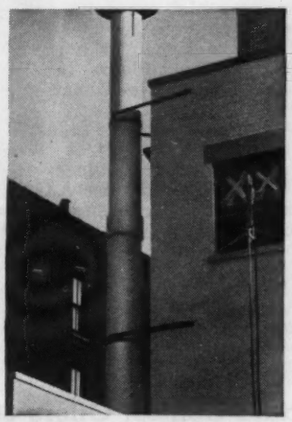
Home Service Conference To Be in Kansas City, Mo.

The second annual Home Service Conference and Training Course will be held June 7-10 in Kansas City, Mo. Sponsored by the A.G.A. Home Service Committee, chairman, Mildred Clark, home service supervisor, Oklahoma Natural Gas Co., the conference will be attended by members of the home service departments of gas companies throughout the county as well as by teachers and students from university home economics departments.

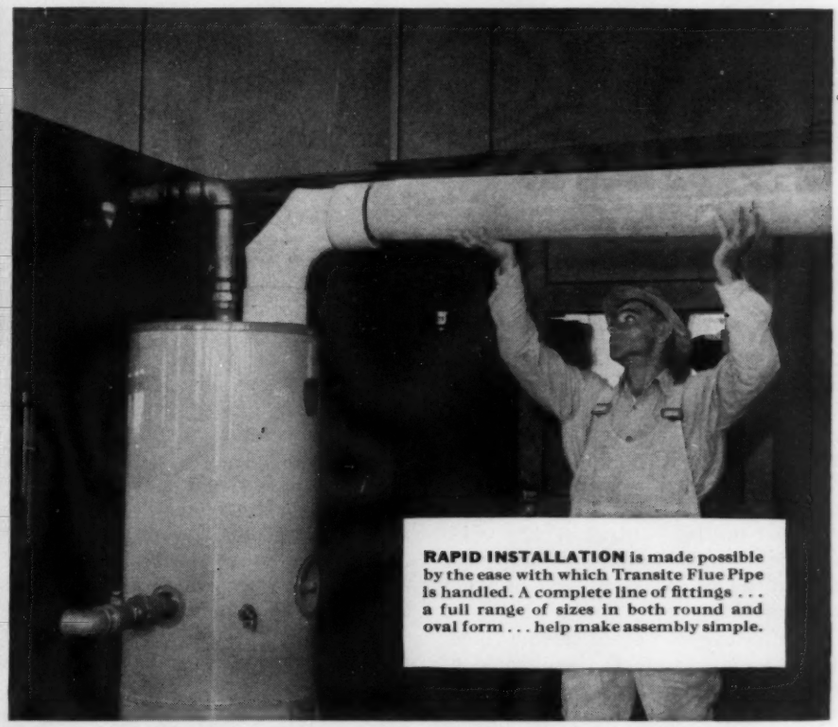
GOES UP FAST... STAYS UP LONGER!



INDOORS, the asbestos-cement composition of Transite Flue Pipe considerably reduces fire hazard . . . and its unusually high corrosion resistance keeps maintenance at the minimum.



OUTDOORS, the asbestos-cement composition is also of great benefit. Weatherproof and unusually resistant to corrosion, Transite Flue Pipe keeps stack temperatures high for long distances, improving draft and minimizing condensation.



RAPID INSTALLATION is made possible by the ease with which Transite Flue Pipe is handled. A complete line of fittings . . . a full range of sizes in both round and oval form . . . help make assembly simple.

Easy to install . . . provided with a complete line of fittings . . . Transite Flue Pipe adds years of trouble-free service to gas-venting systems

ANY way you look at it, using J-M Transite Flue Pipe on all your gas-venting jobs benefits you. Installations can be completed rapidly. And the asbestos-cement composition of Transite Flue Pipe provides high resistance to corrosion . . . assures long life with a minimum of maintenance.

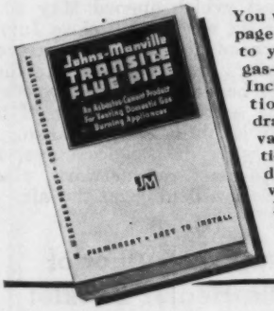
Transite Flue Pipe comes with a complete line of fittings and in a full range of sizes. Even in crowded working space, these features make assembly a relatively simple job. For installation in partitions the pipe is furnished in the more generally used oval sizes.

And once Transite Flue Pipe is installed, the job is really *finished*. This durable pipe stands up for years under severe service conditions. For Transite Flue Pipe is absolutely weatherproof . . . highly resistant to corrosive fumes and gases.

In addition, the low conductivity of Transite Flue Pipe keeps stack temperatures at a high level for long distances, thus improving draft and minimizing condensation in the flue. Approved by the National Board of Fire Underwriters, Transite offers high resistance to intense heat . . . reduces fire hazard. And, despite all these advantages, the cost is surprisingly low.

Check the facts yourself. They're all in the Transite Flue Pipe Manual. For a copy, send the coupon to Johns-Manville, 22 East 40th Street, N.Y.C.

Send for this FREE Manual



You will find in this 20-page book the answers to your troublesome gas-venting problems. Included are descriptions and detailed drawings of a wide variety of installations . . . complete details on sizes, weights and prices. For your free copy, mail the coupon.

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JM PRODUCTS

TRANSITE FLUE PIPE

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Send me your free 20-page Transite Flue Pipe Manual

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SALES SLANTS

A month by month presentation of experiences on the sales front.

Five Steps to Persuasion

ONE of the great faults of most salesmen* is that they do not pay enough attention to *how* they talk to buyers. Too many of them have a "poker voice." They rattle off a sales talk, or whatever it might be they wish to tell a man, without any voice inflection. They just don't realize that the skillful control of the voice is quite as important in getting over an idea, as is the substance of what one is saying.

Salesmen should practice voice modulation, and acquire the knack of being able to win and hold a man's interest by talking in a bright and interesting way, and raising and lowering the voice so as to get full attention.

There are no "mysteries" or "tricks" to selling. The essential things are to be able to present a proposition to a man in such a way that he can quickly grasp what you are talking about, and plant your thoughts in his mind so that you lead him from one step to the other.

The whole sequence of making a sale is right on the fingers of one hand. They are: 1. Comparison. 2. Suggestion. 3. Explanation. 4. Confirmation. 5. Conclusion.

In selling you compare two illustrations, or two ideas, which are practically alike. One shows the advantages of your proposition while the other shows the disadvantages of another proposition, or the disadvantages of not accepting your proposition. Take the case of a man selling gas house heating equipment. He compares the prospect's home with a similar home, emphasizing the advantages of the equipment in parallel illustrations.

Now what do these comparisons suggest to the prospect? If the salesman has made out a good case they suggest that the prospect buy. But the prospect does not always act on the suggestion. Here the salesman begins to analyze the proposal.

In this analysis or explanation the salesman goes into all necessary details and gives the facts the prospect needs to help him make up his mind. But the chances are that the prospect still hesitates. He needs to see the facts confirmed, and here we begin step No. 4, confirmation. In confirming we submit proof, use testimonials, tell what our product has done for others. Now we have him convinced and are ready for closing.

Here the salesman summarizes quickly, drives home the appeal for his proposal and closes the transaction. This completes the stair of the five steps that lead to the buyer's decision.

* Excerpts from an address by Benjamin F. Bills, Bills Realty Corp., Chicago, presented before the Chicago Sales Executive Club and published in American Business, March, 1938.

The sequence of making a sale is right on the fingers of one hand.

■ ■

P. G. and E. Distributes "Home Builders" Book to Public

Pacific Gas and Electric Co. is currently distributing to the public a "Home Builders' Idea Book," and has already received many congratulations on the volume, which contains 86 pages of heavy coated stock.

It was designed as a guide for prospective home builders in the planning of heating, water heating, kitchens, wiring and lighting.

A suggestion of the scope of this book can be had from just one section—"Heating," which includes such points as an explanation of the A.G.A. approval label, points on choosing a furnace, and house insulation. In the discussion about choosing a type of furnace, detailed consideration is given steam and hot water, warm air conditioning, summer air conditioning, warm air heating.

Other sections of the book are equally comprehensive.

■ ■

Radio Contest Offers 300 Refrigerators as Prizes

George S. Jones, Jr., vice-president and general sales manager of Servel, Inc., has announced that 300 Servel Electrolux refrigerators will have been awarded to the same number of winners during the nation-wide competition now being conducted over the radio by Proctor and Gamble, soap manufacturers.

The contest, which opened May 20 to continue for six weeks, will close July 1. Every afternoon for five days a week 10 refrigerators are given away to those adjudged the best writers of 25 words to complete the sentence beginning "I like P & G White Naphtha Soap because . . ." The contest which is broadcast over the NBC coast-to-coast red network, places gas refrigeration doubly on the air.

■ ■

J. M. Krappe is Author of Automatic Heater Booklet

J. M. Krappe, associate in gas engineering, Purdue University, Lafayette, Ind., is the author of a 72-page research bulletin on automatic gas-fired water heaters. The booklet which has many illustrations and tabular information deals with efficiencies, out-put capacities, temperature constancy, etc. An article on this topic by Professor Krappe was published in the January issue of GAS, page 21.

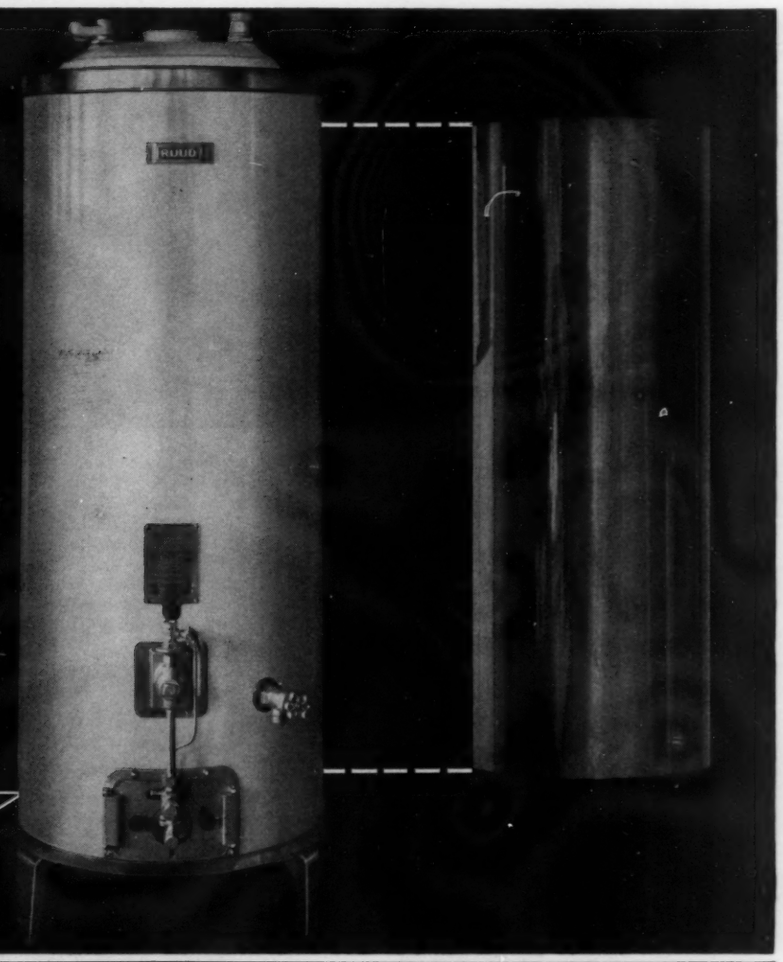
Solid

MONEL

tanks in

RUUD

Gas Water Heaters



Check over the advantages they offer your client as shown in the list below

Q. *What is meant by "solid Monel tank"?*

A. The Monel tank in the Ruud Gas Water Heater is constructed of a single thickness of heavy Monel. It is not a bi-metal, a plating, a coating or a lining. It is solid Monel* through and through.

Q. *Is Monel rust proof?*

A. Yes. Monel is absolutely immune to rust. As a matter of fact Monel tanks are guaranteed for 20 years against rust.

Q. *Is Monel strong and tough?*

A. Yes. Monel is stronger than bridge steel and many times tougher.

Q. *Do any of the chemical purification processes used on water supplies leave any substances in the water which are injurious to Monel?*

A. No.

Q. *Is the Monel tank affected by sustained water temperature of about 150° F.?*

A. No. Although temperatures above 140° F. increase the rate of rusting in ordinary tanks, Monel is not affected.

Q. *What size Ruud Gas Water Heaters are available with Monel tanks?*

A. 20, 30, and 45 gallons.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street **New York, N. Y.**

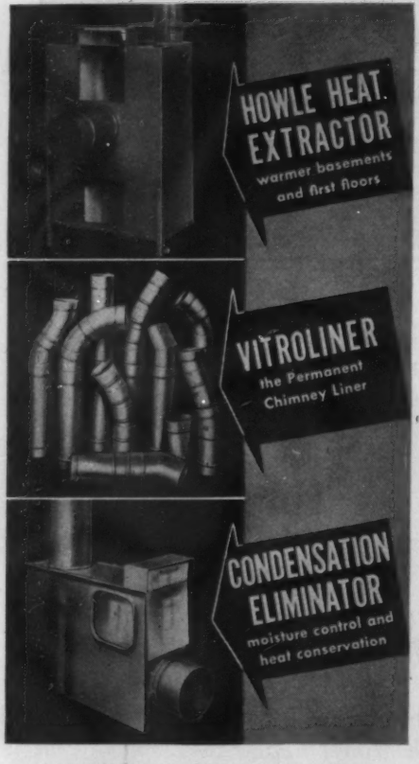
INCO MONEL

* MONEL is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. This alloy is mined, smelted, refined, rolled and marketed solely by International Nickel.

ANY TWO OF THESE 3 UNITS WILL GUARANTEE—

1. CHIMNEY PROTECTION
2. MORE HEAT
3. FUEL ECONOMY

These are the products which *complete* the scientifically efficient home-heating plant, manufactured and guaranteed by the Pioneers in Condensation Control.



BE INFORMED—Send for complete descriptive literature for guaranteed fuel economy and heat satisfaction.

Canadian Address:
184 Herton Street London, Ontario, Canada

CONDENSATION ENGINEERING CORPORATION
TELEPHONE MONROE 1031
335 South Western Avenue, Chicago

Members of the Domestic Range Committee which met to discuss the Certified Performance Range (left to right) C. C. Young, Gas Service Co.; George E. Frazer, Chicago; W. E. Derwent, George D. Roper Corp.; J. W. West, Jr., secretary, Commercial Section A.G.A.; F. M Houston, Rochester Gas & Electric Corp; R. A. Malony, Bridgeport Gas Light Co.; C. W. Berghorn, managing director, A.G.A.E.M.; (standing left to right) Allan Tappan, Tappan Stove Co., vice-chairman of the committee; A. F. Rice, Southern California Gas Co.; J. R. Booth, Roberts & Mander Stove Co.; Lloyd C. Ginn, American Stove Co.; E. R. Guyer, Cribben & Sexton Co.; R. S. Agee, sales promotion manager, A.G.A.E.M., for the Certified Performance Gas Range Program, and B. T. Franck, Grand Rapids Gas Light Co.

Committee Discusses Plans To Promote C. P. Range

PLANS soon to be made public for the forthcoming promotional campaign on the Certified Performance Gas Range Program, to be launched on August 1, were reviewed at a meeting of the Domestic Range Committee of the American Gas Association in New York City on April 25.

At the meeting it was disclosed that at that time 12 leading manufacturers had signified intentions to produce Certified Performance Gas Ranges. These appliances will be designed around 22 specifications which will make for improved convenience, perfect performance, and maximum efficiency.

In order to insure complete coverage, the entire United States was divided into 16 regions with a "regional manager" in charge of each. These regional heads assisted by state and district managers will conduct a series of demonstrations and lectures on the Range program for utility representatives and retail dealer outlets. During these demonstrations colorful charts will be used to describe the features of the new range. Promotional plans for the product will also be discussed.

The progress made so far in preparing for the opening of the nation-wide drive was approved by the joint committee of manufacturer members of the Association of Gas Appliance and Equipment Manufacturers and gas company executives representing the American Gas Association. F. M. Houston, of the Rochester Gas & Electric Corp., of Rochester, N. Y., chairman of the committee, presided.

Wisconsin Corp. Publishes Water Heater Proof Book

The Wisconsin Public Service Corp., Milwaukee, has recently published a Proof Book on the advantages, use, and installation of gas water heaters. The book is illustrated with pictures of homes equipped with gas water heaters as well as pictures of the types of heaters offered by Ruud Manufacturing Co. and John Wood Manufacturing Co. The publication includes comments by home owners concerning the efficiency of their own gas water heaters.

Included in the proof book is a Report of Tests conducted on an oil fired steam boiler equipped to furnish domestic hot water supply throughout the year, compiled by F. H. Faulstich, Springfield Gas Light Co. water heating department.

■ ■

Stove Manufacturers Plan Merchandising Convention

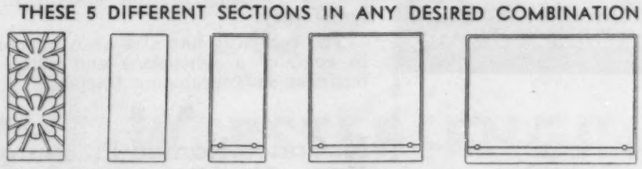
The Institute of Cooking and Heating Appliance Manufacturers, with offices in the Shoreham Hotel, Washington, D. C., announces through its managing director, Samuel Dunckel, a Mid-year Convention on June 9 and 10, at the Netherland Plaza Hotel, Cincinnati. This meeting will be devoted principally to a consideration of merchandising problems and their solutions.

CUSTOM-BUILT FOR MAXIMUM KITCHEN EFFICIENCY

20 PER CENT MORE COOKING AREA FROM FLOOR SPACE USED

Designed by commercial cooking engineers, the new Wedgewood Heavy Duty Ranges can prepare 20 percent more food than any other range using the same floor space. Burners are wider spaced and the cooking top is 1/5 larger. Cooking top arrangements may be had in any one of 26 different combinations of hot tops, griddles and high efficiency open burners—permitting the chef to literally design his own Wedgewood Gas Range to meet his particular requirements.

THESE 5 DIFFERENT SECTIONS IN ANY DESIRED COMBINATION



OPEN TOP BURNERS | HOT TOP SECTION | SINGLE GRIDDLE | DOUBLE GRIDDLE | TRIPLE GRIDDLE

CAPRI CHOOSES CUSTOM-BUILT WEDGEWOOD

The operators of the successful Capri Restaurants, believing that only the finest equipment is the best investment—choose a Wedgewood Gas Range.

HIGH-SPEED HEATING
★
ECONOMICAL OPERATION
★
FLEXIBLE CAPACITY

Designed to use natural, manufactured or bottled gas.

WEDGEWOOD *Custom Built* **HEAVY DUTY GAS RANGES**

JAMES GRAHAM MANUFACTURING CO., SAN FRANCISCO, LOS ANGELES, NEWARK, CALIFORNIA; PORTLAND, OREGON

Appointments Announced By Coast Counties Co.

R. L. NANCE has been named to the newly created position of service supervisor for the Coast Counties Gas and Electric Co., according to H. L. Farrar, president of that organization. Mr. Nance will make his headquarters in Santa Cruz, and his activities will include the entire service area of that company, extending from Imperial Valley in the south to Dunsmuir, Yreka and Arcata in the north.

E. B. Mason, Jr., replaces Nance as district manager in the Imperial Valley division of Coast Counties Gas and Electric Co., El Centro, where he will direct commercial and sales activities.

Curtis Young has been transferred from the Watsonville district to Imperial Valley as district gas foreman where he will be in charge of gas operations.

■ ■

Montana Natural Gas Is Surveyed In Report

E. S. Perry, geologist for the Montana State Bureau of Mines recently prepared a report describing the occurrence of natural gas in Montana. Although natural gas is now available to one-third of the Montana population, Dr. Perry's report, entitled, Memoir No. Three, presents the first readily available information on the various productive gas fields in Montana.

A summary of Montana commercial gas fields reveals that all of them lie east of the main ranges of the Rocky mountains, mainly in the plains area, in northern, southern, and eastern Montana. Included also in the report is an outline of prospective and unproductive areas within the limits of the state.

■ ■

Natural Gas Is Distributed From North Dakota Wells

The Montana-Dakota Utilities Co. is now distributing natural gas in North Dakota from wells located in the southwestern part of the state, according to a recent announcement by John F. Sullivan, attorney for the company.

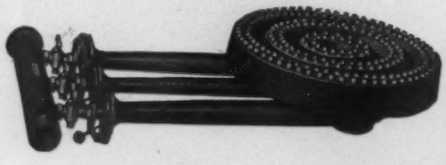
The gas wells were connected to the the Montana-Dakota distribution system on April 23, and in the first seven days more than 3,500,000 cu. ft. of gas were taken from them. This changeover marks the first time in North Dakota history that the company has distributed natural gas in that state. Mr. Sullivan declared that the volume of gas and heavy pressure from the wells indicate a substantial field in southwestern North Dakota.

■ ■

L. B. Terry Dies In Ohio

L. B. Terry, for 35 years Akron manager of the East Ohio Gas Co., died April 14, at his Ohio home. Mr. Terry. who helped in the opening of the natural gas resources in Youngstown and Fostoria, Ohio, brought natural gas lines to Akron in 1897. On his retirement from company duties five years ago, Mr. Terry was honored as dean of managers in the utilities groups of East Ohio.

You Get Intense Heat at Low Cost With Johnson No. 40-ABC Ring Burners



Here is a powerful Triple Atmospheric Ring Burner designed to give intense heat at low cost in any installation. The Johnson Patented Direct Jet Regulator assures positive adjustment and perfect, uniform combustion. Each ring is separately controlled, and the Burners can be used singly, doubly, or all three together. Durably made of smooth grey iron. Write for catalog.

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Regional Managers Discuss C. P. Range Promotion

MEETING May 14 in Chicago, the sixteen regional managers of the Certified Performance Gas Range Program presented the new range plan to gas utility representatives and wholesale and retail dealers from all parts of the country. These regional managers will begin a series of conferences on the distribution of the new range product to be placed on display in salesrooms in all major cities of the United States on about August 1.

F. M. Houston, Rochester Gas and Electric Corp., Rochester, N. Y., chairman of the A.G.A. domestic range committee reviewed plans for the nationwide drive to the regional representatives. The program was sponsored jointly by the Association of Gas Appliance and Equipment Manufacturers and the American Gas Association.

Tentative merchandising plans for the Gas Range Program were also discussed by W. E. Derwent, vice-president, George D. Roper Corp., Rockford, Ill., chairman of the A.G.A.E.M. domestic gas range division. J. W. West, Jr., secretary of the commercial section of the A.G.A., and R. S. Agee, A.G.A.E.M. sales promotion manager, also took part in the conference.

■ ■

Lone Star Co. Wins Fort Worth Dilution Battle

With the recent denial by the U. S. Supreme Court of a petition for review of the Fifth Circuit Court of Appeals decision, which held unconstitutional the Fort Worth, Texas, anti-dilution ordinance, the city of Forth Worth lost its fight to prohibit Lone Star Gas Co. from diluting natural gas served to city consumers.

The federal appellate court had ruled that the city can regulate, but not prohibit, the addition of nitrogen and other non-combustible gases, as carried on by Lone Star at its Joshua plant. The long court fight was started by the gas company which sought an injunction in Federal District Court in Fort Worth to prevent enforcement of the ordinance, passed by the city council in 1934.

■ ■

Terrebonne Parish, La., to Have Natural Gas Service

The Police Jury of Terrebonne Parish, La., has authorized the granting of a 99-year franchise to the Gulf Natural Gas Corp., to lay, construct, and maintain a gas distribution system in the community.

The company has also been authorized to conduct a wholesale and retail gas business in Terrebonne Parish.

■ ■

McCance Named Pittsburgh Utility Vice-President

Pressly H. McCance has been elected a vice-president of Philadelphia Co., Pittsburgh, Pa., subsidiary of the Public Utility Engineering and Service Corp., according to an anouncement by Frank R. Phillips, company president. Mr. McCance was formerly assistant to the president and director of personnel for the Philadelphia utility company.

The NEW

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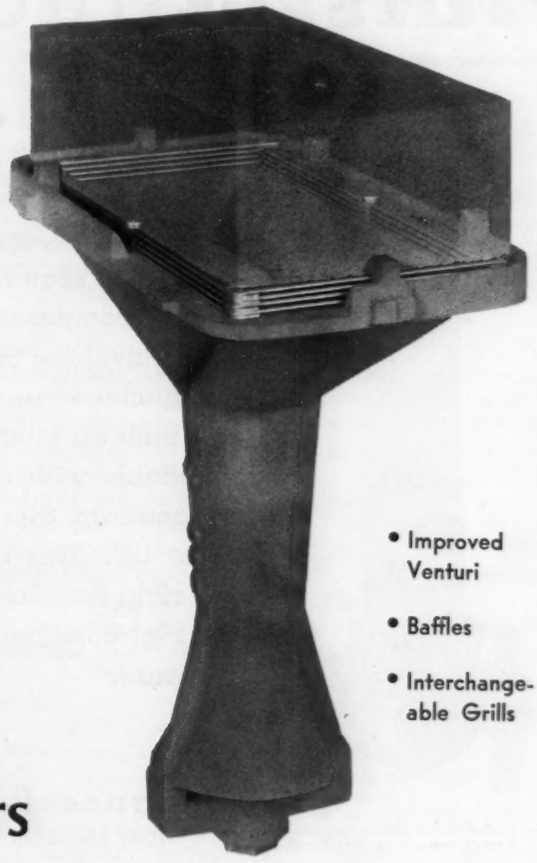
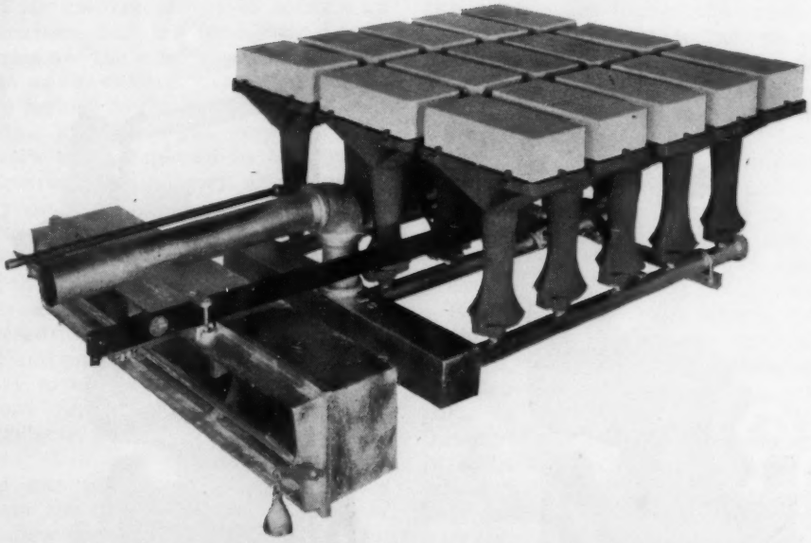
Series Burner

- Improved Venturi and greater port area insure much higher capacities at low pressures.
- Unique Baffles at the outlet of mixing tube makes possible perfectly even distribution of flame completely around the baffle brick. As a result maximum flame length is greatly reduced.
- Interchangeable Grills with multiple ports can be varied to suit the combustion characteristics of various gases. Proper sizing of grills prevents any possibility of flash back.



- Improved Venturi
- Baffles
- Interchangeable Grills

For Metal Firebox Boilers



For all types of steel firebox and sectional boilers the F600 Series burner offers greater capacity per unit at lower pressures, perfect horizontal distribution, and a practical method of utilizing one type of burner on all gaseous fuels.

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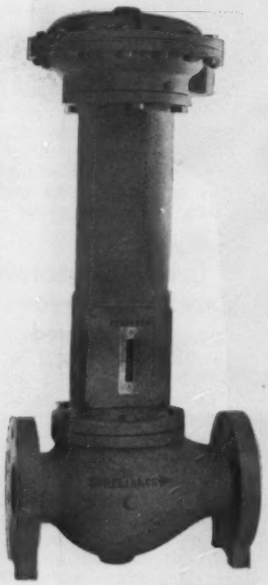

High pressure, under spring loaded, CBVA-400 direct connected reducing Regulator.

Here's a line of eighteen models of Combination Balanced Valve Regulators, in six sizes, all designed after years of intimate contacts in the field and careful studies of what modern conditions require. These Reliance Regulators are, by comparative tests, superior to all others in positiveness of action, accessibility of parts, compactness, and ratio of capacity to size. All are built on interchangeable standard bodies. Available with cast iron or cast steel bodies, in standard trim or stainless steel trim. Sizes 2" to 10". This new Reliance family provides the right Regulator for every distribution or industrial condition, and every inlet and outlet pressure.

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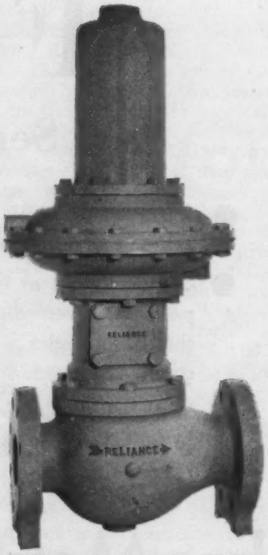
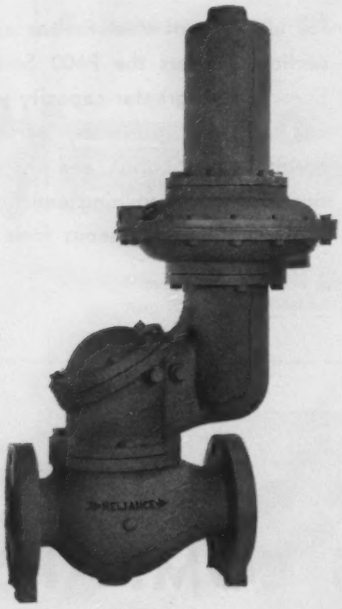
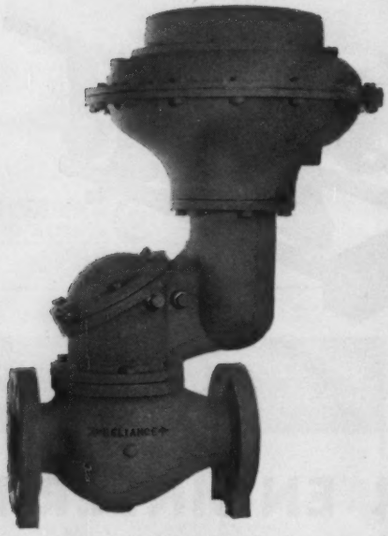


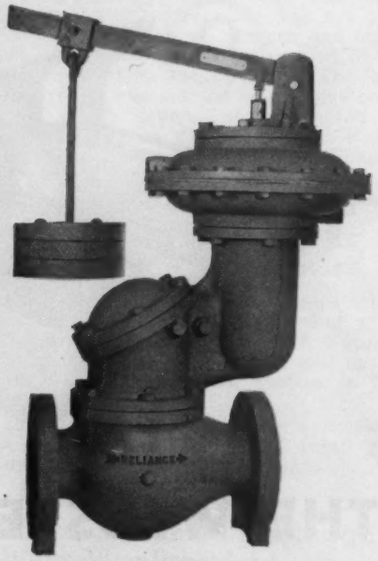
High pressure, spring loaded CBV-101 direct connected reducing Regulator.



High pressure, spring loaded, CBV-201 offset connected reducing Regulator.



High pressure, pilot loaded, CBV-202 offset connected reducing Regulator.



High pressure, outside weight loaded CBV-200 offset connected reducing Regulator.

RELIANCE REGULATORS

MEASUREMENT and CONTROL

Pressure Regulation Equipment

By J. J. DELANEY General Sales Manager
Reliance Regulator Corporation*

PRESSURE regulation deals with the art of controlling fluids, which are usually contained in pipe lines, pressure vessels, reservoirs, etc., to a required standard so that the fluid may ultimately serve its intended purpose more satisfactorily and with greater efficiency and safety. Regulators, as we know them today, reduce pressures of various fluids from a high plane to a lower plane, and industry as a whole has many and varied uses for them. Modern gas pressure regulation is quite a complex problem in all its various phases of today's applications, but the fundamental principles are the same as employed when gas was first used.

J. J. DELANEY

Previous to the discovery and utilization of natural gas, very few regulators were employed in the (manufactured) gas industry, as this industry distributed gas at relatively low pressures and only endeavored to control pressures at the gas works or at the holder stations. However, with the advent of natural gases, high pressures were encountered from the oil and gas wells and it became necessary to employ the use of more and more regulators, and consequently regulator design changed rapidly to meet these new requirements. Natural gas pressures were fairly low from the first wells, which were of shallow depth, but as the drilling industry progressed the wells were drilled to deeper zones which produced more abundantly of both oil and gases and usually at much greater pressures. So that today gas and oil wells are producing pressures up to 3500 lbs. per sq. in. These pressures require suitable regulators made of the various hard alloyed metals to reduce these pressures from the wells to the transmission lines and still further to gas company distribution systems, and individual households and appliances for proper utilization.

Some of these extremely high pressures require four and five step regulator reductions, depending on the moisture content of the gas and the necessity of taking small stage pressure reductions so as to minimize possibility of regulators freezing, which would occur if the pressure reduction were made in one cut. The pressures being controlled in this manner allow the gas to be distributed to the consumers properly and safely.

High pressure regulators are expressly designed to control from one high stage to the next lower stage, which also might be at a high pressure. The size of the regulator is of course determined by the volume of gas that has to pass through it and in this respect the higher the pressure, the more compact the gas volume and naturally for a given capacity the first stage regulator may be of a smaller size than the succeeding regulators which would be operating on lower pressure stages. Each succeeding regulator becomes an individual unit and its construction will vary as to size of body, valves, diaphragm dimensions, etc., according to the outlet pressures required.

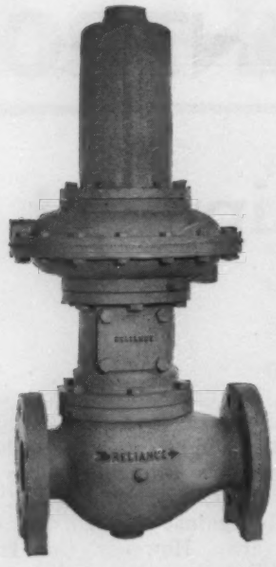
Balanced valve regulators were made so as to obtain large capacities through relatively small bodies, and this type unit consists of two valve ports in the body of the regulator instead of one valve port, consequently additional gas capacity was obtained without increasing the main body castings materially. Some regulators are made with more than two valve ports but it is a question whether more than two are necessary, unless the regulator body casting has a large enough outlet expansion chamber and large enough pipe connections to take the gas away.

The balanced valve regulator takes its name from the fact that the two valves are operating on a single valve stem, each valve directly over the other, and so constructed that the inlet pressure exerts a fairly close balance on the under side of the one valve as against the top side of the other valve. However, this term is mis-applied in that an accurate, true balance is not obtained due to the areas of the valve exposed being somewhat unequal. The lower valve, whose top is exposed to the high pressure has a greater area than the under side of the top valve. This results in a slight unbalancing effect and in unequal distribution of the load through the two valves.

As the pressure is reduced through the valves from the high pressure side of the regulator to the lower pressure side, the fluid flow is extremely turbulent and remains so until it finally becomes accustomed to its new pressure condition. The molecules of gas in going through this expansion process as the pressure is reduced are quite unruly as to the direction they are being led and this causes the extreme turbulence so frequently found in conventionally designed, offset ported types of regulators. Due to this turbulence of the increased mass volume of gas (or reduction of pressure) energy is wasted on the walls of the castings and on the working parts of the regulator, such as the valves themselves, valve seats, valve stems, etc., and tends to produce results in time that appreciably wear these parts, giving poor regulation and erratic control. This condition is greatly magnified and occurs sooner when any abrasive material is carried with the gas.

Most regulators are installed with little thought as to the kind of load they are required to handle, and are generally mistreated as to pressure ranges and volume capacities expected of them. It is well to remember that everything about the regulator, with the exception of the slight movement of the valve, is shaped into a definite size, and for this reason extreme care should be taken in calculating capaci-

*Presented before the Southern California Meter Association, Huntington Park, Calif., April 28, 1938.



High pressure, spring loaded CBV-101 direct connected reducing regulator.

ties of regulators to meet certain set requirements, both as to inlet and outlet pressure ranges specifically, along with specific gravity and temperature ranges.

A greater choice is provided the design engineer of today in the selection of the proper metals and other materials used in regulator construction. Alloyed metals with nickel, molybdenum, chromium and iron compositions are now being made into castings having tensile strengths in excess of 60,000 lbs. with excellent machinability and other desirable characteristics. These units are capable of operating on inlet pressures as high as 600 lbs. when fabricated with blends of these materials. For higher pressures than this, steel castings are employed that are capable of handling the most extreme case under normal temperatures and pipe line strains.

Diaphragm materials for high pressure regulators are also available in much stronger materials, and with the help of the engineering forces of the various composition fabricators, sheet stocks are produced with cross weaving fabric inserts, that are standing under pressures twice as great as materials of this type produced 10 years ago. For this reason, diaphragms will last much longer without failure and give the flexing and sensitiveness required for the most accurate control. Sheet stocks of these diaphragm materials are available in varying thicknesses in single, double and triple ply fabric inserts. The majority of the compositions used for binding the fabric and making it fluid tight are composed of synthetic compounds which are impervious to the attacks of gas, oil, water, etc. This also tends to insure long life and a maximum of safety from rupture or deterioration.

The valve seat cover materials are fashioned from various compositions and metals, and the use of either type depends on the service the regulator must operate under. Soft pliable compositions of varying Duro hardness, semi-soft and hard compositions are at hand for use as valve seat discs, and rendering efficient service under mild and extreme load conditions with either high or low pressure differentials across the regulator, providing low lock-up pressure when no flow exists and withstanding abrasive cutting action to a remarkable degree. A good resiliency is dominant in most of these materials, which also adds to longer life of the valve seat discs and minimizes maintenance costs of early replacements. They are also moisture proof and impervious to any ordinary attack of gas, oil, water, etc.

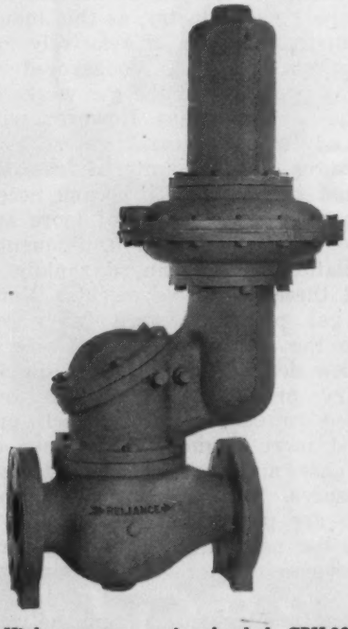
Metal valve seat disc material is used generally where extremely high differential pressures exist across the regulator and where absolute shut-offs are not essential. Different metals are used for this purpose, such as soft drawn copper, mixtures of lead, tin, nickel, etc., alloyed iron and special steels. These materials all stand up remarkably well considering the beating they take from abrasive materials passing through the pipe lines, such as sand from the wells, dirt left in pipe lines when constructed, welding tips, stones, etc. These foreign particles will cut out any type or kind of material in time and it is just a matter of how much of this abrasive material the fluid carries that should determine for the operating man how often he should be required to inspect the regulator installation and make the necessary repairs and replacement of worn parts.

The lever weight actuated types of regulators have been the most commonly used in the past for high pressures, dead weight predominating, and are still used on low pressure work, but as production, transmission, and distribution loads became more severe, it was necessary to look for other means of counterweighting the diaphragm in order to secure the proper control desired. Spring loading and pilot pressure loading then came into being.

The lever and weight style function through a fulcrum action of a lever, and produce a multiplied counteracting power which is exerted on the diaphragm, and changes in outlet pressures are obtained by hanging weights at the required position on the lever arm. On fairly steady and constant flows, and where inlet and outlet pressures do not vary greatly, this type of regulator is still very useful and gives extremely good operating results, but where load conditions change frequently and inlet and outlet pressures vary considerably, the action of this type of regulator is to pulsate, because the changing flow conditions are occuring faster than the time it takes this type of regulator to regain its equilibrium and maintain the lever arm in a quiet position. Stabilizers or dash pots have been employed successfully in steadying this pulsation, and they are now built into the newest types of regulators and are part of their standard equipment. They act as a shock absorber and produce enough friction to overcome the pulsation difficulties.

Direct weight application to the diaphragm is still employed in the low pressure and semi-low pressure regulators and gives outlet pressures of from 3 in. water pressure to a maximum of about 40 in. water pressure. Both inside and outside weights are provided, the governing factor on the inside enclosed method of weight loading being entirely dependent on the available space in the upper section of the diaphragm chamber.

Spring actuated regulators are used extensively today in many types of installations and give very good performance. This method is more compact than the lever weighted types and reduces pulsation materially on

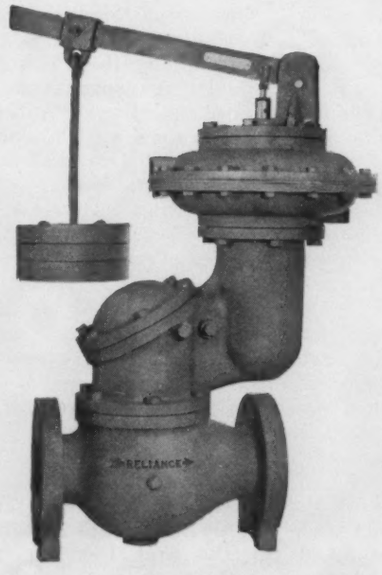


High pressure, spring loaded, CBV-201 offset connected reducing regulator.

ordinary standard designed units. Different types of diaphragm chambers can be provided and where the spring actuating mechanism can be provided either on top of the diaphragm or on the under side of the phragm or on the under side of the operate equally well.

Latest designs provide for non-rising adjustment stems, fully enclosed and working on roller races which allow adjustments to be made easily and with little effort. Adjustment screws can then be covered and sealed to prevent tampering. Where diaphragm chambers are provided on the regulators with top adjusting springs, little effort or time is lost in changing from one spring to another, as the spring bonnet can be quickly removed and the springs changed immediately. While with regulators having the adjustment spring on the under side of the diaphragm, more time is required to change from one spring to another as it then becomes necessary to remove the entire diaphragm chamber.

Various size springs are employed on the same regulator to give a close control for the pressure required. Therefore, there may be a group of different springs required to give the best regulation over a narrow range, i.e., an 11 in. diaphragm chamber has a special spring for best regulation between one and three lbs., another spring from three to seven lbs., while still another from seven to 10 lbs., and while the last mentioned spring will give some degree of regulation on the lower range of pressures it will not give as good results as the one to three lb. spring, nor can any of them be compressed to give more than their individual maximum range.



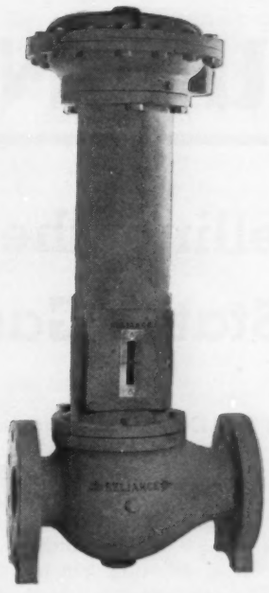
High pressure, outside weight loaded CBV-200 offset connected reducing regulator.

Pilot or pressure loaded diaphragm chambers have neither springs, weights nor lever as actuating devices but employ a gaseous fluid, usually air or gas, to counteract the opposing forces. These diaphragm chambers are very compact and larger size chambers are used for a higher range of outlet pressures, because the pressures on both sides of the diaphragm are nearly balanced and for this reason give a very great degree of sensitiveness not found in other mechanical operated types.

The pilot or pressure controller supplying the pressure to the main diaphragm chamber may be directly connected to the main chamber or remotely attached as required or best suited for a particular design, either one works equally well. The pilots are small individual regulators, and operate on very small flows. To insure continued good performance from them and to allow the master diaphragm chamber to follow its load with upward or downward motion as required, a small escapement of gas to atmosphere is provided between the pilot and the main diaphragm chamber. A screen chamber or filter for removing any dirt or foreign particles in the gas or air should be installed ahead of these pilot units. The trend at present, in making regulator installations, is to use pilots or control instruments as much as possible, and quite a few companies are considering, and some of them are using, master station control where all regulators and master meters are centrally located, and pilot or lead runs carried to the regulators for a distance of several thousand feet.

Low pressure regulators are also pilot loaded, using a larger and more sensitive low pressure pilot regulator, but operating in the same manner as the high pressure type. Most regulator installations are now laid out using mechanical actuated diaphragm chambers (where pilot leakage is objectionable due to location on customer premises and where this leakage might prove hazardous) for outlet pressure requirements up to 125 lbs. Above this point and to 250 lbs. pilot loading pressure is used and for still higher outlet pressures, instrument pressure controllers, which actuate larger diaphragm chambers on the regulator than could be ordinarily provided with the other types of actuating systems.

With the various actuating forces available, i.e., springs, lever, and



High pressure, under spring loaded, CBVA-400 direct connected reducing regulator.

weights, pilots or instrument controllers, any degree of sensitivity can be obtained, even in extreme cases where the inlet pressures and load requirements vary considerably. The pressure loaded regulators give the best service but the pilot or instrument leak presents hazards not always acceptable or wanted by the operating man, principally due to the location the regulator must be set in. Spring loaded regulators give the next best performance within a narrow range of volume changes, but do not perform too well over the full stroke of the valves. Expanding and weakening springs account for this and as the valves tend to open wider the spring tension is lessened and naturally starts producing uneven outlet pressure control. Lever and weight types of regulators give good follow through performance in endeavoring to keep up with varying flow requirements, but their action is usually slow and if changes in load occur too fast, pulsation sets in, which tends to throw the weights off the lever and plays havoc in general.

Conclusions

With the general construction of regulators of better metals, diaphragms and seating materials, and constant thought given to accuracy of control with a minimum of wasted effort, the results have proven most gratifying in making engineers and operators regulator-conscious, and have taken the regulator out of the fitting class where it has been for

(Continued on Page 66)

BUTANE-PROPANE NEWS

Selling the Rural Consumer—The Atlantic States Gas Co. Shows What Can Be Done

WITHIN 15 month's actual field promotion, Atlantic States Gas Co., operating through subsidiaries in central New York and eastern Pennsylvania, has acquired better than 9,000 customers beyond the reach of existing gas main facilities. The average gas usage of these customers has proven to be 200 gals. of propane-butane gas per year.

Atlantic States Gas Co., which is a subsidiary of Commonwealth Gas Corp., one of the large natural gas producing and transmitting organizations in the eastern and southern fields, is under the personal management of Colonel George A. Burrell, well known as the discoverer of helium in the United States and an authority on petroleum gas, and of Byron B. Stroud, whose pioneering work in the more efficient and economical distribution of liquefied petroleum gas is well recognized.

Through subsidiaries, the Atlantic States Co. operates in three general areas: the Mohawk Gas Co. with headquarters at Cortland, in central New York; and the East Penn Gas Co. with headquarters at Lancaster and Lewistown in Pennsylvania.

In organizing the Company, Colonel Burrell and Mr. Stroud worked on the basic assumption that a gas service similar to that enjoyed by customers of conventional gas companies should achieve a saturation of customers in areas beyond city gas lines equal to that obtained within areas served by pipe line companies, provided the service could be rendered at a comparable cost.

An installation system was devised, and after field experiments the sponsors felt justified in believing that such a gas service could be rendered profitably and still provide the cooking, water heating, and refrigeration facilities of manufacturers of city gas service at approximately the same cost to the customer. It was the ability to do this which is perhaps more responsible than any other factor for the rapid development of the company's promotional program.

In every respect the service rendered by the company to the customer is comparable with that furnished by piped gas companies. Metering of the gas, billing, automatic continuous supply of fuel—all are in accordance with standard city gas practice. This similarity goes further than the operation of the system. The company does not concentrate primarily on the more wealthy suburbanites and occasional well-to-do farmers, but rather on all of the homes of average purchasing power within a given area of operation.

COL. G. A. BURRELL BYRON B. STROUD

STARTING FROM scratch, and operating in rural areas in Eastern Pennsylvania and Central New York, the Atlantic States Gas Company secured better than 9,000 customers and sold nearly $1,000,000 worth of gas appliances within a 15 months' period. There are 17,000,000 American homes beyond existing piped gas systems, and as the article suggests, a relatively modest percentage of these would constitute the basis for a gigantic liquefied petroleum gas industry.—Editor.

It should be clearly understood that Atlantic States Gas Co. was not the first organization to use metering, underground tanks, truck deliveries, city gas rates, etc. Various organizations in different parts of the country had previously used one or more of these features and more are using them today. Atlantic States has combined all these features into a single system geared to the gas utility business outlook and methods.

The company's system provides for the use of a 60-40 per cent butane-propane mixture stored in individual underground gas reservoirs. A cylindrical five ft. by two ft. welded steel tank covered with a protective coating is buried horizontally in a hole four ft. deep. The top of the tank and the seamless copper tubing into the house are two ft. below the surface of the ground and lead to a low pressure regulator and to a meter which reads to the nearest hundred cu. ft.

Upon emerging as a liquid from the tank, the butane-propane mixture passes through a high pressure regulator at which point, because the pressure is reduced to three lbs. the fuel is transformed into a gas and is reduced to eleven inches by the low pressure regulator before entering the meter. The five ft. by two ft. tank has a capacity of 125 gals. and is used for ordinary one or two appliance domestic installations. Larger tanks of 400-gal. and 600 gal. capacities are used for commercial, industrial and large domestic customers, such as those heating their homes with gas. In general the size of tank employed is designed to be large enough so that the tank need be refilled about once every six or eight months. Replenishing the tank is accomplished by pumping the gas in a liquid state under pressure from a specially designed tank truck of either 800- or 1000-gal. capacity. The company has six such tank trucks. These tank trucks are in turn loaded each morning at bulk storage stations with a capacity of 30,000 gals. There are tank car deliveries of gas to the bulk storage stations.

In consideration of a $9.75 installation charge, a contract is made with the customer in which he agrees to purchase all his gas requirements exclusively from the company at the specified rate schedule. This rate schedule, in terms of an equivalent cu. ft. of 537 B.t.u., is designed to attract water heating and commercial business. The domestic rate amounts to $2.30 for the first 1000 cu. ft. and 81c per M c.f. thereafter. The domestic monthly minimum charge for 500 cu. ft. or less is $1.49 net.

For larger consumers there is a rate of 70c per M c.f. with a $5.50 minimum charge for 5000 cu. ft. or less. For larger users these rates are less than most city rates. The rates as shown are net after deduction of a 10 per cent discount which is allowed customers if payment is made within 10 days after billing.

The Atlantic States Gas Co. has been notably successful in popularizing its service in the face of determined sales promotion efforts by some of the electric utility companies in its areas. In order to judge intelligently how the cost of gas service as rendered by the Atlantic States Gas Company compares with the equivalent service as rendered by electricity, it is necessary to make certain assumptions for uses and also for conversion factors.

These assumptions are as follows: (as provided by a competing electric utility company):

Residential Use	Kw. hr. per Month	Therms per Month
Refrigeration	40	10
Range	100	7½
Automatic Water Heating	300	20
Lights and Small Appliances	40	..

The rates of the Atlantic States Gas Co. are shown in Table No. 1.

The electric rate used in this comparison is the most prevalent residential rate now in effect in the company's rural territories, which is as follows:

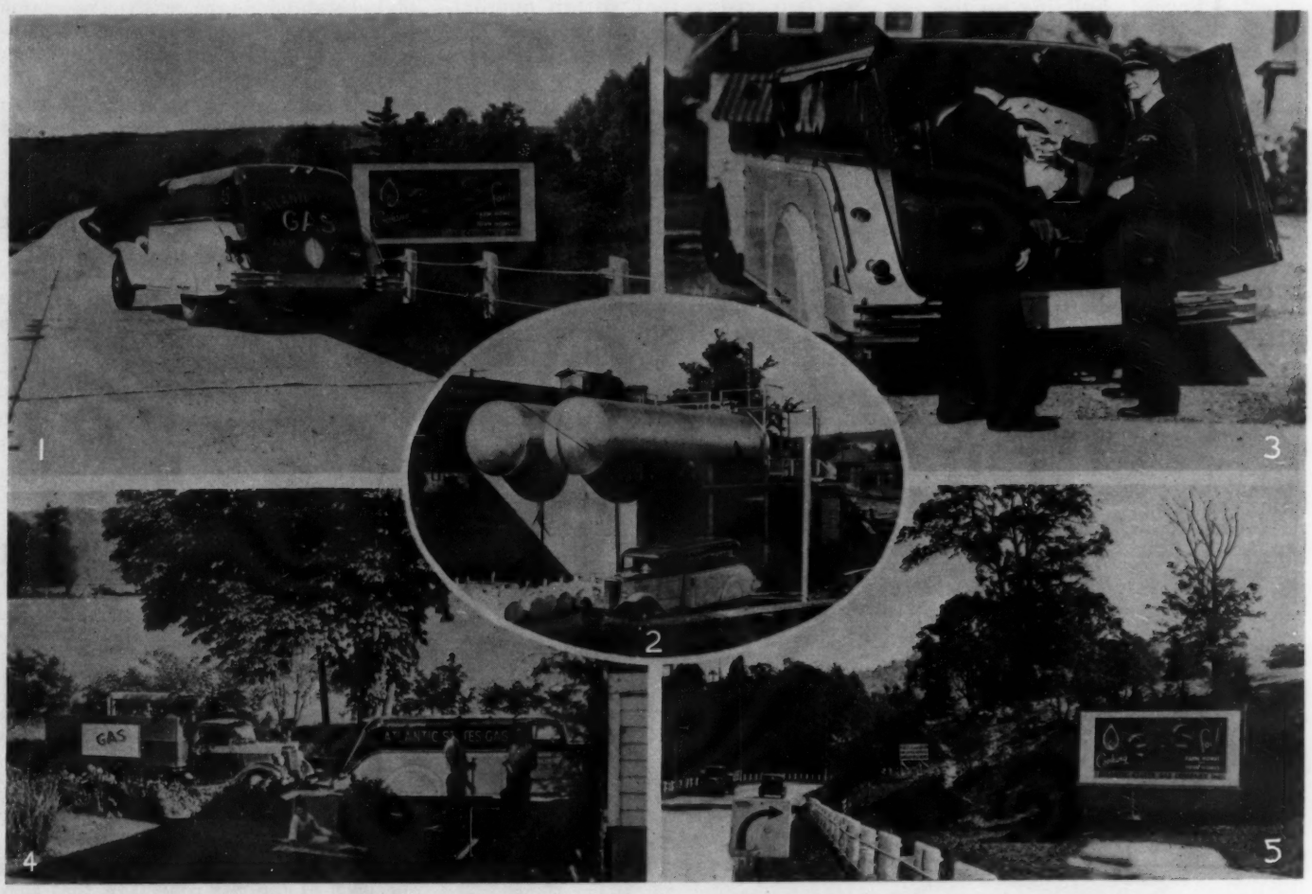
First	12 kw. hrs.	$1.00
Next	48 kw. hrs.	.05 per kw. hr.
Next	90 kw. hrs.	.04 per kw. hr.
Over	150 kw. hrs.	.015 per kw. hr.

The comparative costs of gas and electric service in the Atlantic States Gas Co. terrtiory are shown in Table No. 2 on the following page.

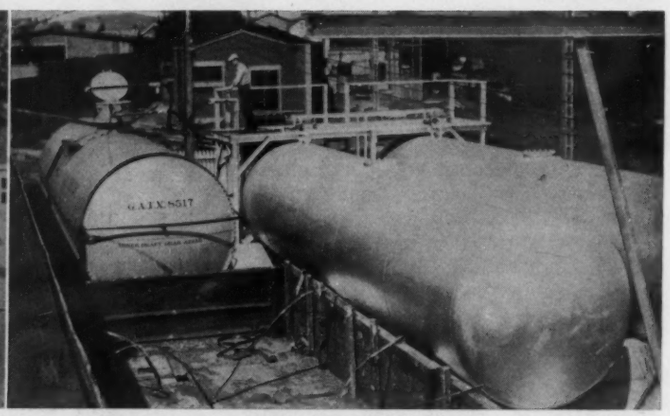
In the spring of 1936 the company set up three areas with bulk stations at Lancaster and Lewistown, Pa., and Cortland, N. Y. Areas of approximately 50 miles in radius were determined upon and the boundaries set. Each area was divided into 20 zones, containing from 3,000 to 7,000 potential customers. Over each area was placed a sales manager. Under him directly were the 20 zone managers, who in turn were responsible for from three to five salesmen. Organized and trained in special salesman schools, the selling force totalled 220 men by the fall of 1936. Starting with monthly sales of 200 new customers, there was a month-by-month increase until in June, July and August, 1937, sales were in excess of 1,000 new meters per month. A total of approximately 9,000 customers was obtained in this accelerating manner and approximately $1,000,000 of appliances sold in the 15 months ending in September, 1937. The breakdown of appliance sales for this 15 month period is as follows:

	No. Sold	Total Sales	Av. Price
Ranges	5540	$624,571	$113
Water Heaters	1390	100,076	72
Electrolux	500	108,478	217
Space Heaters	1207	29,150	24
Lights	919	6,849	7
Hot Plates	829	10,263	12
Commercial Appliances	696	68,186	98
Miscellaneous	..	8,484	..
Total		$956,057	

At the end of September, 1937, there were 9,009 customers. The average sale per customer is $106.12. This average in a sense is lower than actually obtained, since a substantial number of customers already owned



Activity in the Atlantic States Co. territory: (1) Gas on its way to a rural home. Note the billboard in the background. (2) The Bulk Station of the East Penn Gas Co. at Lewistown, Pa. (3) The driver is explaining how it works to a curious customer. (4) There'll soon be modern gas service in this farmhouse. Beginning an installation. (5) One of the many billboards along the highways in the territory served by the subsidiary companies of the Atlantic States Gas Co. in Eastern Pennsylvania and Central New York.



AT LEFT: Replenishing underground tank, normally once in every six to eight months. AT RIGHT: Transferring propane-butane from a tank car to the bulk station, Lewistown, Pa. In the foreground is the gondola car in which a supply of underground tanks have been delivered. Note the straps for safe packing.

appliances which were adjusted to the high B.t.u. gas and connected to the system for a nominal charge.

At the termination of this highly successful 15 months' drive, the company's board of directors, pending new financing, decided to take advantage of this opportunity to consolidate gains made. Accordingly, efforts in the past few months have been directed towards building up the gas load by sale of additional appliances to old customers. It is interesting that despite the cessation af activities directed towards obtaining new customers, the three Area offices of the company report receiving daily in the mails now from six to 10 unsolicited requests for installations.

A careful survey had been made before the selection of the three areas and they naturally represent better-than-average territory. However, it was surprising that within approximately the 18,000 square miles covered by these three areas, there is a total of 319,000 families and commercial establishments without pipe line gas service.

It is typical of the company's attitude that every one of the 319,000 families and commercial establishments without piped gas in its three areas is considered to be a potential customer. Company officials point out that of 319,000 families and commercial establishments with the same purchasing power living in cities, upwards of 80 per cent of them, or 255,000, would use gas. "Why not the same result in the country?" runs the argument, "if the gas service and gas rates and availability are identical?"

While Atlantic States will actually be satisfied with the business provided by a considerably smaller percentage of its potential consumers than 80 per cent, nevertheless, the implications of the above question to the liquefied gas industry as a whole are of real importance. Even a relatively modest percentage of the 17,000,000 families now living beyond gas mains, would constitute the basis for a giant industry.

TABLE NO. 1. ATLANTIC STATES GAS CO. RATES

Regular Rate	Basis 537 Btu. per cu. ft.
First 500 cu. ft. or less	$1.50 minimum
Next 500 cu. ft.	.16 per 100 cu. ft. (.298 per therm)
Next 4000 cu. ft.	.08 per 100 cu. ft. (.149 per therm)
Next 5000 cu. ft.	.07 per 100 cu. ft. (.13 per therm)
Over 10,000 cu. ft.	.06 per 100 cu. ft. (.111 per therm)

TABLE NO. 2. COMPARISON OF GAS AND ELECTRIC COSTS

Customer Has: Electric Bill	Customer Adds	Electric Bill Total	Cost Electric Marginal	Marginal Cost Gas	tage of Gas Advan-
Lights and Small Appliances, 40 kw. hrs. $2.40	Range	$ 6.60	$4.20	$2.62	$1.58
	Refrigerator	4.20	1.80	2.99	1.19
	Water Heater	9.85	7.45	4.48	2.97
	Range and Refrigerator	7.45	5.05	4.10	.95
	Range and Water Heater	11.35	8.95	5.59	3.36
	Refrigerator and Water Heater	10.45	8.05	5.91	2.14
	Range, Refrigerator and Water Heater	11.95	9.55	6.88	2.67
Lights Small Appliances and Refrigerator $4.20	Range	$ 7.45	$3.25	$2.62	$ .63
	Water Heater	10.45	6.25	4.48	1.77
	Range and Water Heater	11.95	7.75	5.59	2.16
Lights, Small Appliances, and Range..$6.60	Refrigerator	$ 7.45	$ .85	$2.99	$2.14
	Water Heater	11.35	4.75	4.48	.27
	Refrigerator and Water Heater	11.95	5.35	5.91	.56
Lights, Small Appliances, Refrigerator and Range..$7.45	Water Heater	$11.95	$4.50	$4.48	$ .02

■ ■

Warren Petroleum Corp. Installs Butane Equipment

The Warren Petroleum Corp., is installing refrigeration equipment for the manufacture of butane in the company's gasoline plant at Arkansas Pass, Texas. The plant, which was completed February 15, is processing 110,000,000 cu. ft. of gas daily. It is the only gasoline plant in the field and is served by gas from the McCampbell field nearby.

■ ■

Iowa Town to Have Butane

Estherville, Iowa, will soon be served by butane gas, according to a recent decision of the city council of that community. New equipment will be required for the storage and distribution of the new gas. Plans are now under way for a 15,000 gal. storage tank.

San Joaquin Co. Prepares to Extend Gas Service

SAN JOAQUIN Light and Power Corp., Fresno, Calif., expects to begin construction within a month of a gas main extending from the city of Merced to the town of Livingston at the northern border of Merced County. This line will be about 15 miles long and the total investment will be, according to preliminary estimates, $247,000.00.

Solicitors are now in the field signing up customers, not only in Livingston, but in the town of Atwater, six miles north of Merced. Taps will be made on the main line from time to time so that service can be supplied to rural customers between the several communities.

The line is to follow the state highway and the permits have just been obtained from the State Highway Commission. This will be natural gas from the Kettleman Hills wells, and it is expected that service will begin with about 500 customers.

■ ■

Fresno Butane Distributors Expand Storage Plant

Truck Fuels, Inc., butane distributors, have recently completed the expansion of the company's storage plant in Fresno, Calif. Butane storage facilities have been increased from 5000 gal. to 15,000 gal. capacity.

The purpose of the expansion program has been to meet the increasing butane demand not only in Fresno proper, but also among San Joaquin Valley farm operators who are using butane to power farm equipment. Since the opening of its Fresno station in 1935, Truck Fuels has maintained a free advisory service for farm operators as well as a 24-house service.

■ ■

McGinley Is Manager of Arizona Co. Subsidiary

W. G. McGinley, for the past five years manager of the Winslow plant of the Arizona Gas Co., has taken over the management of the Western Gas Distribution Co., subsidiary of the Arizona company, with headquarters in Los Angeles. With the departure of Mr. McGinley for California, John J. Koeneman, manager of the company's Barstow, Calif., plant, took direct charge of the Winslow office.

■ ■

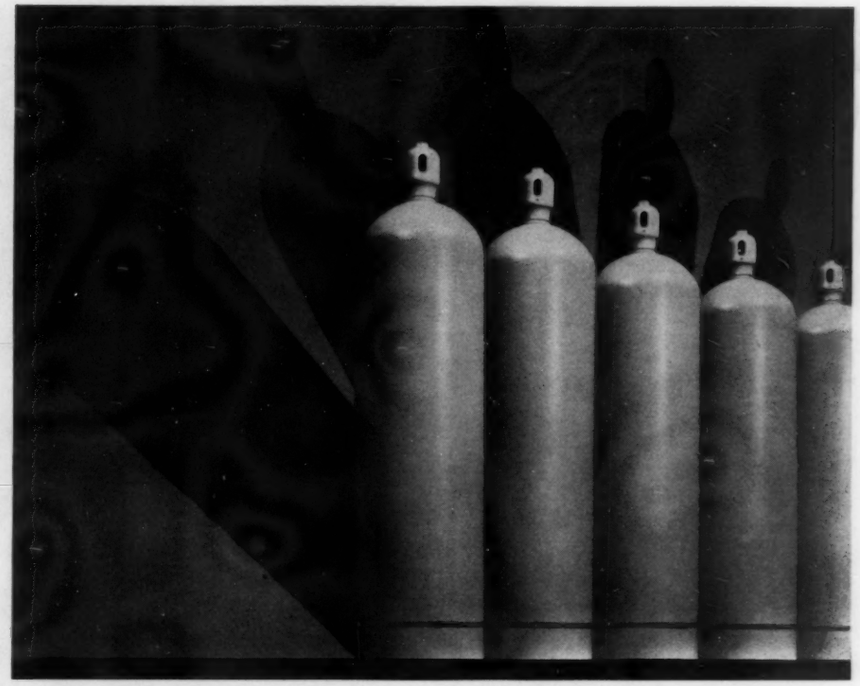
Kansas University Offers Natural Gas Course

Kansas University, at the request of the American Gas Association, is now offering a natural gas extension course. Present enrollments in the course number 326, and there have been 103 completions. The lectures include a study of natural gas from origin to utilization.

■ ■

C. H. Shaw Dies in April

Charles H. Shaw, for the past three years Philadelphia office manager for the Worthington Pump and Machinery Corp., died at his home on April 15. Associated with Worthington since 1920, Mr. Shaw was manager of the corporation's Pittsburgh office during the seven years from 1928 to 1935.



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N.F.P.A. Committee on Gases Completes Report

The Committee on Gases of the National Fire Protection Association, has submitted its report on proposed changes in the regulations for the design, installation and construction of containers and pertinent equipment for the storage, handling and transportation of liquefied petroleum gases, to the N. F. P. A. membership at the Atlantic City meeting, May 10.

The continuing increase in the use of liquefied petroleum gases for industrial and domestic purposes has occasioned the need of properly enforced safety requirements for the construction and installation of distribution systems. The Liquefied Petroleum Gas Association is establishing a Committee on Regulations which will review regulations affecting their industry and advise the association executive board so that industry opinions may be submitted to the regulatory authorities.

N. F. P. A. regulations have been adopted as state requirements in Texas and Michigan, and bills for their adoption are now pending in three other states.

■ ■

Petoskey Gas Co. Installs Butane System

V. W. Packard, manager of the Petoskey Gas Co., Mich., has announced that the company is at the present time making the necessary changes and improvements for installation of a butane gas plant and distribution system. The company has previously served Petoskey consumers with coal gas and carburetted water gas. The new gas will have a 530 B.t.u. heating value.

With the completion of the installation, which was scheduled for May 15, the Petoskey Co. is planning to develop additional resort business in outlying districts.

■ ■

E. F. Lamprey Rejoins Sales Force of Barber-Greene

E. F. Lamprey, for many years with Barber-Greene and for the past few years sales manager of a machinery house in the Boston territory, has rejoined the Barber-Greene sales organization. He will work out of the Boston office, 84 Rogers St., Cambridge. W. B. Holder is Eastern sales manager.

Distributors recently appointed to handle the Barber-Greene account in their respective territories are A. R. Amos, Jr., Philadelphia, Pa.; Columbia Equipment Co., Portland, Ore.; A. E. Hunt, Vancouver, B. C., Canada; J. Shuman Hower, Utica, N. Y.

W. T. Jones Co., Salt Lake City, will sell mining, smelting, and other equipment purchased by manufacturers. The Lund Machinery Co. continues to represent Barber-Greene in this territory on contracting, sand and gravel handling, etc., equipment.

■ ■

Georgetown, Ohio, Served By Liquefied Petroleum Gas

The Verkamp Corp., Cincinnati, Ohio, has recently extended its liquefied petroleum gas service to Georgetown, Ohio. To meet all needs, the company has installed 60 lb. and 100 lb. Philgas cylinders, 420 lb. above ground metered service and 500 to 1000 lb. underground service.

Distributing gas in Ohio, Indiana, and Kentucky, the Verkamp Corp., showed a 70 per cent increase in business in 1937 over 1936.

■ ■

Blythe Gas Co., California Extends Its Mains

The Blythe Gas Co., Calif., has started work on the company's first main extensions since the installation of the distribution system a year ago. The laying of 1200 ft. of two-in. pipe on the west side of Blythe is now taking place. In addition, 800 ft. of three-quarter in. service lines are being extended to houses. The west side of the community has previously been served by tank gas. The approximate cost of the improvements will be $800.

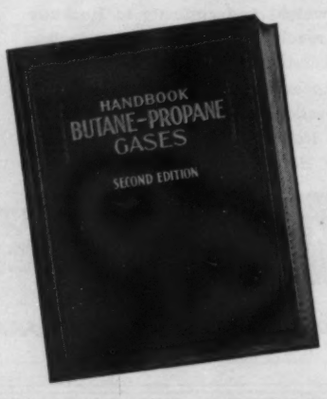
■ ■

Pankow Will Direct Sales for Detroit-Michigan Stove Co.

John A. Fry, president of Detroit-Michigan Stove Co., has announced the appointment of John C. Pankow as director of sales.

Mr. Pankow has been associated with Detroit-Michigan Stove Co. for 22 years, and for the past several years has been sales manager. He will be assisted by William J. Hill and Fred A. Kaiser, who has been appointed sales manager to assume Mr. Pankow's former duties.

HANDBOOK
BUTANE
PROPANE
GASES



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1938 P.C.G.A. COOPERATIVE ADVERTISING CALENDAR

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JUNE

COMMITTEE
A. C. Joy (Chairman), P. G. & E.
J. S. Spaulding, So. Calif. Gas Co.

75 YEARS of GAS COOKERY
Four generations of this interesting Oakland (Calif.) family speak from personal experience.
★ Great-grandmother (Mrs. Henry Hamilton): "My own gas cooking experience extends over 40 years. I still bake the bread for our family. With the new heat-controlled gas oven, I am sure of perfect results every time."
★★ Grandmother (Mrs. F. V. Vollmer): "I have cooked with gas for 30 years, and it has never failed me. Even the old gas 'cook stove' with which I started housekeeping, would perform admirably today. Of the many modern improvements, I appreciate most the insulated oven that keeps my kitchen cool, and the smokeless speed-broiler."
★★★ Young Mother (Mrs. Wm. A. Vollmer): "I cannot imagine any appliance more thrillingly modern than my own new gas range. Its speed and automatic controls are such a help in preparing Baby's food, and give me more leisure for his care."
★★★★ Baby William Frederick ("Ricky" to his doting family): "Da! Glug." signifying whole-hearted agreement by the fourth generation.
MRS. F. V. VOLLMER (above) has been president of the Oakland City Club of 1500 members for five consecutive terms and was active in parent-teacher work for 17 years. ★ With the aid of quick, dependable gas, she has always done her own cooking. She prepares all food early in the morning; times her roasts by the pound for slow, "tenderizing" cooking under automatic oven-heat control. Her busy life has included an outdoor hobby, gardening—and the rearing of two sons, now married.
Your Gas Company or Appliance Dealer is showing 1938 model gas ranges. Ask for a demonstration, and terms to fit your budget.
GAS THE MODERN FUEL — YOUR QUICK, CLEAN, ECONOMICAL SERVANT

FOUR GENERATIONS of this California family acclaim gas cookery—another ad in the series of "interesting personalities" for domestic publications: Sunset Magazine, California Parent-Teacher, California Federation News and Parent-Teacher Journal. Tests show *unusually high reader-interest* on the part of home-makers who are the best prospects for modern gas appliances. Manufacturers and dealers share benefits; gas companies gladly pay costs.

A. G. A. Commercial Sales Group Holds N. Y. Meeting

GAS STAFF REPORT

THE Hotel, Restaurant and Commercial Sales Conference of the Industrial Gas Section of the A.G.A. was held in New York May 23-24. There were 176 registrations. Hale A. Clark, chairman, industrial gas section, opened the conference. In his keynote address, Nils T. Sellman, assistant vice president, Consolidated Edison Co., New York, stressed the need for constant market analysis to study its fuel needs and the profitable application of gas in it.

Commercial cooking was discussed by Harry O. King, Standard Gas Equipment Corp. and J. F. Quinn, The Brooklyn Union Gas Co. Mr. King emphasized the importance of active cooperation between equipment dealers and the utilities in securing maximum gas usage, and Mr. Quinn told of new developments in heavy duty cooking equipment. The success of his company in selling bake ovens to "corner bakers" was described by Lawrence R. Foote, Central Illinois Electric & Gas Co., Rockford, Ill. Clayton S. Cronkright, Public Service Electric & Gas Co., Newark supplemented Mr. Foote in the baking field by describing recent improvements in baking equipment. Kenneth L. Childs, vice-president, Automatic Food Equipment Co., Inc. Somerville, Mass., in discussing advanced technique in fat frying, decried the present abuses of the art of frying in the average restaurant and recommended "progressive" shallow fat frying as the best answer to the problem.

According to T. J. Gallagher, The Peoples Gas Light & Coke Co., Chicago, the recent 60-day campaign on heavy duty equipment in Chicago, during which the gas company suspended its own merchandising of this equipment in favor of the dealer, has produced gratifying results. Dealers were helped with direct by mail advertising prepared and furnished by the gas company. At the Monday Luncheon, Zenn Kaufman spoke on "Showmanship in Business."

Frank H. Trembly, Jr., The Philadelphia Gas Works Co., presided at the Monday afternoon session. The speakers were John S. McElwain, The Peoples Natural Gas Co., Pittsburgh, "Selling complete gas service to commercial customers;" Robert D. MacDonald, Consolidated Edison Co., New York, "Garages and other establishments;" L. D. McClure, Philadelphia Electric Co., "Selling automatic gas water heating to commercial establishments;" and Henry M. Finn, president, Hydro-Therm Sterilizer Corp., Boston, who described the growing demand for gas fired sterilizers induced by local ordinances and state laws. The Bridgeport Gas Light Co. already has 800 such jobs on their system representing estimated additional annual load of 25,500,000 cu. ft.

Tuesday Sessions

J. P. Leinroth, Public Service Electric & Gas Co. Newark, presided over the Tuesday morning session. Walter G. Groth, United American Bosch Corp., Springfield, Mass., suggested that further improvements in water heating lay for the most part in better lay-outs and installations, and that increased usage would be prompted by revised rates and still more sales enthusiasm. F. C. Neuls, The Brooklyn Union Gas Co., described his company's experiences with commercial refrigeration and illustrated his address with slides. Daniel C. Brogan, the G. S. Blodgett Co., Burlington, presided at the afternoon session, which opened with a talk by Sybil Stearns, director of concessions, City of New York, "How a customer evaluates commercial gas service," followed by R. A. Bell, Surface Combustion Corp. Mr. Bell stated that gas unit heater sales had increased 128.0 per cent in 1937 over 1936, as compared with an increase of 78.2 per cent for other types of unit heaters. The gas-fired unit heater is rapidly becoming most popular.

The program ended with a humorous skit entitled "Selling gas equipment to a barber" presented by Fred T. Head and Howard H. Lippe of the Consolidated Edison Co., and Harry Pere of the Brooklyn Union Gas Co.

During the Monday morning session, R. E. Wright, New England Gas & Electric Association, offered a resolution of sympathy over the recent death of L. B. Crossman.

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G 206-638

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Gas Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Gas Appliance Society, 1355 Market Street, San Francisco, California.

Ask Dearborn First

Before deciding on your protection for underground pipe, get the latest information not only on undercoating but on wrappers as well. Great progress has been made by the Dearborn Chemical Company, both in repelling moisture and in increasing dielectric strength. Inquiries invited.

Dearborn Chemical Company

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San Francisco: 421 Bryant Street Phone SUtter 8688

Facts on Selling Gas Service

(Continued from Page 19)

that any salesman of whom you could answer "yes" on the question of his ability to sell should pass on all other scores. It is no easy job to determine the answer to this question. Without an actual trial, your reactions as to the selling ability of an applicant in trying to sell himself to you is about as good an indication as can be made quickly of this qualification. Is the man one who is simply trying to append himself to your payroll, or does he offer you more sales, more volume, more profit through the acquisition of his services? In other words, can he sell himself to you.

It has been stated that salesmanship is 50 per cent personality and 50 per cent knowledge of product, prospect and selling. Let us accept this statement for the moment as fact. Anyone with average intelligence can learn all that he need know about his product. He can, furthermore, with proper guidance, ground himself in the fundamentals of selling. As to whether or not he can integrate this knowledge into the "art of doing" is another thing and the stumbling block over which too many salesmen fall. Again I say, failure at this point is not entirely the salesman's fault. He needs guidance, instruction and supervision in developing this selling art.

Most salesmen feel that they are properly equipped on product training. The results of most checks of sales presentations indicate that lack of information on product is not the chief deficiency of salesmen. Merchants also generally feel that their source of product information for the training of salesmen is adequate. The reason for this undoubtedly is due to the fact that manufacturers produce most of their sales material around the product. It has always been rather difficult to understand why more emphasis is not placed on the use values or customer advantages for which a product was built. It is a fact that this vital information is placed in the background too frequently. A wealth of information on a product almost invariably is available to any salesman who will look for it.

The fourth factor, the sale, seems to present, to most executives, the greatest difficulty in the whole sales training problem. The interpretation intended as to this phase of selling is the procedure resulting in contact with the prospect, both physically and mentally, involving the steps taken to assist this prospect in arriving at buying decisions.

A Salesman's Needs

In other words, the principles and fundamentals of selling as a science and art are here involved. A discussion of the needs of salesmen as to this subdivision of selling suggests a segregation into two groups: (1) salesmen of more or less experience now engaged by the industry; (2) new salesmen to meet the demands of the industry.

Needless to say, the training of prospective salesmen will differ from that given the working salesmen.

Regarding the new salesman, assuming that material has been carefully selected, it is a sad commentary that these novices are so frequently placed on their own responsibility and left to their own devices. A complete, carefully-prepared curriculum of instruction in selling, canvassing, product training, prospect appraisal and rela-

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tions, company policy and field practice should be inaugurated; furthermore, this training should be specific and basic and involve sufficient practice procedure to build confidence and develop a certain degree of skill.

Passing on to the working salesmen, all of whom have had some experience, it is my opinion that they should have repeated training and review of the science and art of salesmanship. New products, new methods, new technique, changing psychology and standards of living will quickly obsolete a salesman who does not keep abreast of the times. It might be thought that a salesman's daily work will keep him at maximum efficiency in the art of selling, but most people including salesmen, are not analytical and without concentrated study and perhaps some guidance, will miss the new wrinkles.

Adjustment to Conditions

It has been borne out by history that the selling methods of any period grow out of the economic situation of the time. Methods not in harmony with the economic situation are doomed. Selling must adjust itself to changing conditions if it is to continue to be successful.

For that reason, most authorities agree that training, if it is not carried on as a continuous program, should be undertaken at least once a year on a complete review basis in a manner which will emphasize changing practices.

There is considerable difference of opinion as to just how this may be brought about. Many of the texts on selling are old, trite platitudes. These offer little that is new and interesting to "firing-line" salesmen and often discourage rather than inspire. In fact, the absence of suitable sales guides is one of the reasons for the perplexity in connection with sales training.

Two courses are open with respect to selecting a sales text to follow in executing a sales training course. One is to prepare a specific pertinent text combining the principles of salesmanship and their application in the field; in other words, a salesmanship course on one particular commodity or associated commodities.

The second method would consist of a fundamental course on salesmanship geared to the particular type of selling involved, for example, a good text on specialty selling, retail selling, or wholesale selling.

The latter method requires the interpretation into the art of doing of each principle or element of salesmanship by some capable leader. Obviously the success of this procedure rests largely on the group leader.

In the first place, it lends itself to the conference style of training which invites the participation of every salesman, thus multiplying examples and experience.

Of more importance the latter method, involving the use of a sound up-to-the-minute basic text, permits the solution of one of the greatest deficiencies in sales training—full utilization of the Law of Exceptions.

Selling methods are too generally standardized. Salesmen use too much of the poll parrot stuff. The real factors and technique which make for success in sales in one industry cannot, in most cases, be carried over into another. In many cases, they cannot even be transferred from one company to another in the same industry and very often they will not work with different products in the same company. In other words, the way to more effective selling is painstaking, thorough analysis of selling methods and factors to make them specific, practical and individual. A word, time, method and motion study should be applied to every article a salesman sells. In this way may unsuccessful methods be replaced.

GF

Toggled Reducing
REGULATORS
For Low Pressures

Perfectly conventional routine behavior is maintained at all times where regulators like those illustrated are placed on guard. These two 14 in. low-pressure units are for use in a by-product coke plant. Chaplin-Fulton devices for pressure control have been known and approved over 50 years. Write for catalog, Chaplin-Fulton Manufacturing Company, 28-40 Penn Ave., Pittsburgh, Pa.

Nothing Dramatic Ever Happens
in the presence of
CHAPLIN-FULTON REGULATORS

INDUSTRIAL
GAS BOILERS

Plain tubular..... ¾ to 10 H.P.
Water Leg tubular..... 5 to 45 H.P.
HE Flueless ..... 1 to 18 H.P.

ASME Code for 100 lbs. S.W.P., also for higher pressures.
Non-electric Low Water Cut-offs for all types of boilers.

P. M. Lattner Mfg. Company
CEDAR RAPIDS IOWA

BUILD LOAD WITH *Satisfied* CONSUMERS*

* The BEST way to assure *complete* consumer satisfaction with gas as an economical fuel is to recommend an inspection of the COMPLETE LINE OF

PACIFIC GAS HEATING APPLIANCES

THERMOLATORS
RADIANT CIRCULATORS
WALL HEATERS
RADIANT HEATERS
FLOOR FURNACES
GRAVITY FURNACES
CENTRAL BLOWER FURNACES
INDUSTRIAL UNIT HEATERS
FORCED-AIR UNITS
WATER HEATERS

Pacific
GAS RADIATOR CO.
1740 W. Washington Blvd., Los Angeles, Calif.
Manufacturers of the Most Complete Line of Gas Heating Appliances in the West

Pacific Multi-Tubular Burners Set a New High in Gas Heating Economy and Efficiency. Orifices **Precision Drilled** at Factory to Assure Perfect Combustion Permanently.

Orifice Metering Is Topic At S.C.M.A. Meeting

"ORIFICE Meter Operation and Maintenance," was the topic discussed by M. J. Cereghino of the Southern California Gas Co. at the regular monthly meeting of the Southern California Meter Association held in Huntington Park on May 26. President J. B. Taylor of the Signal Oil and Gas Co. conducted the meeting. Mr. Cereghino described in detail, illustrating his points with slides, the standard practice of his company in installing orifice meter set ups.

As an educational feature the Association presented Don A. DeWolf, engineer in charge, National Broadcasting Co., who described the many and lengthy preparations that must be made in order to broadcast over nation wide hook up a speech that might not fill more than 40 seconds time.

Musical entertainment during the evening was furnished through the courtesy of the American Meter Co. Plans are now going forward for the Association's annual "Low Jinks" to be held this month.

■ ■

A Discussion of Pressure Regulation Equipment

(Continued from Page 55)

so long, and placed it in the instrument class where it belongs. Operators and men working on regulators today have more knowledge of the unit's performance than ever before, and the mechanics of the regulators have been simplified and arranged to allow quick and easy maintenance. No one regulator does every job exactly the same, and each unit is an individual performing mechanism doing its best, usually, under widely varying conditions of pressure and flow.

■ ■

Gas Measurement Course to Be Started in California

W. H. Carson, dean of the college of engineering, University of Oklahoma, Norman, is planning to organize in California, for the summer of 1939, a gas measurement short course, similar to the one held annually in Norman, Okla. Although Mr. Carson received requests from a California group to start a short course this year, he suggested that about 40 representatives attend the Oklahoma session next year in order to become acquainted with the handling of the course.

■ ■

Natural Gas Pipe Line To Iron Range Is Planned

A natural gas pipe line from the Garland, Wyo., and Cut Bank and Baker, Mont., gas fields to Duluth, Minn., the Mesaba iron range, and the Twin Cities is planned. The proposed line, if developed, will make it possible to use low-grade iron ores of Minnesota in the manufacture of steel and iron, and it would then be possible to do the processing in iron ore districts.

New 1938 Model

The heater that SMILES while it Warms

FRASER

Radiant Front Console

Notice the modern streamline design and the two-tone walnut finish. Made in five sizes from 20,000 to 60,000 B.T.U.'s. Also available with built-in fan.

MANUFACTURED BY
FRASER FURNACE CO.
STOCKTON, CALIFORNIA

DISTRIBUTED BY
H. R. BASFORD COMPANY
425 Second St., San Francisco
911 S. Grand Ave., Los Angeles

Profitable DITCHING

With Barber-Greenes

There are Four Barber-Greene Ditchers—
The Standard
The Pipeline Special
The Utility Special
The Service Special

You can have the many advantages of the exclusive B-G Vertical Boom in a machine designed for your peculiar needs. Ask for complete information, there is no obligation.

BARBER GREENE
715 West Park Ave.
Aurora, Ill.
36-17

A.G.A. Issues Engineering Handbook for Salesmen

The American Gas Association has just published a new engineering handbook, "Comfort Heating," prepared by the Commercial Section Committee on Engineering Handbook, C. George Segeler, chairman. Designed for house heating and direct heating salesmen who need technical information in a simplified and workable form, the handbook includes tables on heat transmission and equipment selecting which simplify the technical phases for the convenience of the salesman. Another feature of the book is the inclusion of the capacity of convectors of various manufacturers, designed for ready reference.

Printed on Kraft paper which will take ink, the book allows space for marginal notes and additional data to be inserted. The handbook can be used as it is bound, or, by removal of the plastic comb, can be inserted in any standard three-ring binder. The book is priced at $2.00 per copy in single orders with a quantity price schedule available on application.

■ ■

Guessing Contest Promotes Gas Refrigerator Sales

The Oklahoma Natural Gas Co. and Hales-Mullaly, Inc., Claremore, Okla., are sponsoring a customer guessing contest to run concurrently with the Electrolux "Get Dressed" contest for dealers and salesmen.

The object of the contest is to guess how much less than 1½c a day it costs to operate an Electrolux refrigerator. The winner in the state who guesses the nearest correct amount will be awarded an Electrolux refrigerator. There will also be a number of cash awards equalling $25.00 down payments on refrigerators.

■ ■

Republic Natural Gas Co. Will Move to Dallas

The Republic Natural Gas Co. is planning to move its central headquarters from Corpus Christi, Texas, to Dallas, according to a recent announcement by Alfred Hurlburt, vice-president and general manager. The move will take place about August 1, when the company will bring about 100 employes to the Houseman building in Dallas.

According to W. H. Wildes, Republic president, the reason for the firm's move is to afford a central location which will enable company officials to divide their time between South Texas and Kansas properties.

■ ■

Monel-Ruud Advertising Campaign Featured

"Ruud goes Monel" is the new slogan featured in the recent bulletin published by the International Nickel Co. The Monel-Ruud national advertising appearing in magazines, trade papers, and newspapers is designed as an aid in selling Ruud automatic gas water heaters with Monel tanks. The new bulletin explains the current publicity and direct mail program which is being carried on by both companies.

New Absorption Plant Opens In Wilmington, Calif.

Following the recent announcement by M. R. Enderle, vice-president, Wilmington Gasoline Co., Wilmington, Calif., of the opening of the company's Terminal Island absorption plant, the Wilmington Municipal Gas Department has proposed laying a line beneath the harbor entrance channel to pick up dry gas returned from the gasoline company's plant to the Termo Oil Co. lease. This proposal is in accord with the general program for the city to use dry gas produced on city-owned land.

Provisions of the proposal call for a three-party contract whereby the Wilmington Gasoline Co. will take wet gas produced by Termo Co.; the city and Termo Co. will get back 50 per cent of the gasoline extracted and 75 per cent of the dry gas.

■ ■

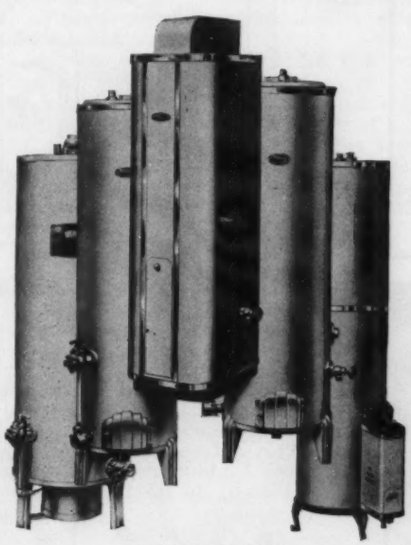
P. G. and E. Holds Series of Dealer Cooking Schools

Pacific Gas and Electric Co., San Francisco, has completed a dealer cooperative series of eight weekly gas cooking schools in the city of Alameda.

The schools were held in the Pacific Gas and Electric Co. building once each week, under the supervision of Mrs. A. Farnsworth, demonstrator for the company.

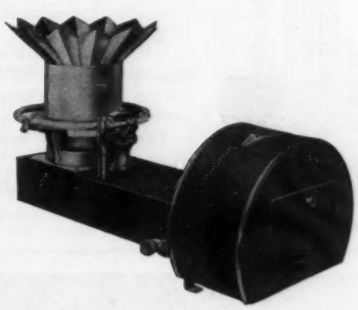
Dealers in Oakland as well as in Alameda sent their customers and prospects to the schools, and the attendance averaged about 40 at each meeting.

Welsbach Products

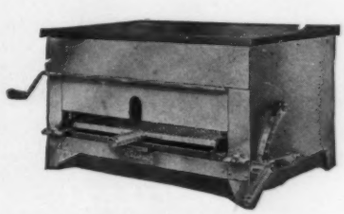


HOTZONE
GAS WATER HEATERS

Welsbach products are favored by natural and manufactured gas companies because of their well-earned reputation for reliability, because they build permanent load and consumer goodwill, because of minimum servicing, and because their design and efficiency (plus Welsbach sales cooperation) make them easy to sell.



FURNACE BURNERS

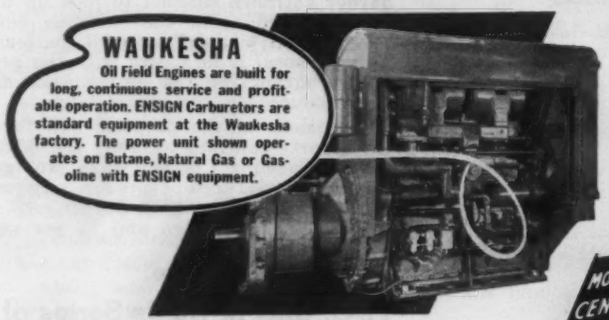


BROILER-GRIDDLES

Welsbach Company

Gloucester City, N. J.—Branches—Chicago, San Francisco

LEADING ENGINE BUILDERS CHOOSE ENSIGN

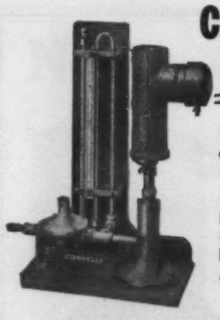


WAUKESHA
Oil Field Engines are built for long, continuous service and profitable operation. ENSIGN Carburetors are standard equipment at the Waukesha factory. The power unit shown operates on Butane, Natural Gas or Gasoline with ENSIGN equipment.

MORE THAN A QUARTER-CENTURY OF EXPERIENCE

ENSIGN Carburetors for Gas, Combination Gas and Gasoline, and Butane fuels are the result of 27 years of field and laboratory research devoted exclusively to improved carburetion. In the oil industry, as well as all other industries requiring efficient, dependable power, ENSIGN Carburetors are supreme. If it's an ENSIGN . . . it's the BEST!

ENSIGN CARBURETOR CO., LTD.
LOS ANGELES · DALLAS · CHICAGO



Connelly CALOROPTIC BTU Control
for Butane, Propane and other Gas Plants

Simple, accurate, direct-reading instrument for determining the heat value of any kind of gas. Useful for guarding against excessive variations in gas quality. May be connected to control panel or used to operate motor valve for closing down plant when BTU's swing beyond high or low limits. Illustrations show hook-up for remote control with distant signal lights and alarm units. Write for Bulletin No. 405-B-1.

CONNELLY IRON SPONGE & GOVERNOR CO.
Chicago, Ill. Pacific Coast Representative: Harry V. Payne, 3834 Third Ave., Los Angeles Elizabeth, N. J.

MUELLER GAS DISTRIBUTION EQUIPMENT

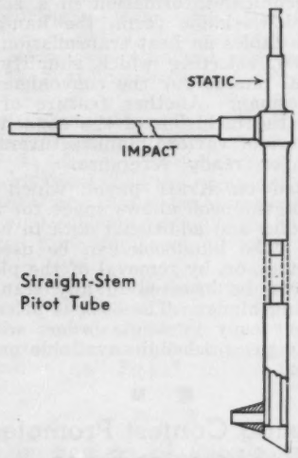
The time-tested Mueller line includes Mueller Evenflow Service Regulators, Gas Stops, Service Stops, Stove Stops, Drilling and Tapping Machines, service boxes, meter trims and similar equipment. Write for description and prices.

MUELLER CO., Los Angeles, Calif.

Factories: Decatur, Ill.; Chattanooga, Tenn.; Los Angeles, Calif.; Sarnia, Ont.
Branches: New York and San Francisco

Ellison Draft Gage Co. Announces New Units

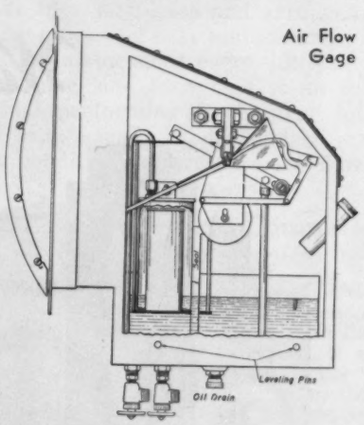
The Ellison Draft Gage Co., Chicago, Ill., has announced a new Straight-Stem Pitot Tube, designed by Lewis M. Ellison, for use in thick wall ducts in which the angle type cannot be conveniently inserted. The outer tube is 5/16 in. O.D., the flow end of which is machined



Straight-Stem Pitot Tube

at an angle of 59°, transmitting a true static pressure through the ⅛ in. inner tube when faced at right angles to the flow. By means of a conical tip, facing the flow, a true impact pressure is transmitted through the outer tube.

The new Ellison Air Flow Gage has also been announced by the company. This gage gives accurate flow measurements of air and gases across an orifice in cfm or cfh on a scale of equal divi-



sions. Square root movement consists of a pointer with camtrack in the counter weight of the pointer, and a cam linked to the gravity arm of the power unit. Power unit consists of a powerful gasometer bell, moving within a stationary bell. This differential system eliminates buoyancy loading weight with plus pressure, thereby increasing the sensitivity of the gage.

■ ■

Madisonville, Texas Votes Gas Plant Bonds

Citizens of Madisonville, Texas, in a special election, have authorized the city council to issue $40,000 worth of revenue bonds to build a municipally-owned butane gas system.

Alexander Forward, managing director, American Gas Association (center) and J. F. Quinlan (right), director and F. W. Williams, assistant director, Home Appliance Planning Bureau examine hundreds of entries already received in A.G.A.'s nationwide Architects' Competition.

Several Thousand Entries Enlisted as A.G.A. Architects' Contest Closes

THE architects' contest, forming the first phase of the three-fold Liberty Home program sponsored by the American Gas Association, closed May 23. Alexander Forward, managing director of the A.G.A., and J. F. Quinlan, director of the A.G.A. Home Appliance Planning Bureau, have revealed that several thousand entrants enlisted in the architects' contest.

During the two-months extent of the contest, entries were received from every state in the Union and the Dominion of Canada, as well as from Bulgaria, England, Venezuela, Cuba, and other foreign countries. Prizes amounting to $13,700 will be awarded for the best designed all-gas homes. Gas companies and manufacturers throughout the country aided contestants in their respective localities by offering the services of their companies with respect to proper kitchen and basement applications.

The architects competition included two parts: 1. House design competition involving the design of a house containing 18,000 cu. ft. to 24,000 cu. ft. with plans for kitchen and basement or utility room and the design of a house containing 24,000 to 32,000 cu. ft. with plans for kitchen and basemen or utility room; 2. Neighborhood planning competition.

The second phase of the Liberty Home program is the builders' contest. Houses to be included in the competition must be completed by July 1, 1939.

■ ■

Porcelain Enamel Institute to Meet

The executive committee of the Porcelain Enamel Institute decided at its Cleveland meeting, April 12, to hold the Eighth Annual Meeting in Cleveland, October 25-26.

The Third Annual Porcelain Enamel Institute Forum will be held at the University of Illinois, Urbana, Ill., October 12-14, according to an announcement by F. E. Hodek, Jr., General Porcelain Enameling and Manufacturing Co., chairman of the Forum committee. Proceedings of the Second Forum of the Porcelain Enamel Institute held at the Ohio State University, Columbus, Ohio, October 13-15, 1937, have been mailed from the Institute offices.

■ ■

Washington Co. Modernizes Showrooms

Washington Gas and Electric Co., Tacoma, Wash., has completed its modernization of showrooms and offices.

Upper walls and ceiling are light in tone with plywood paneling of deeper buff tone, and darker baseboard that blends into marbelized linoleum floor covering. Indirect lighting from spun aluminum fixtures floods the showroom with evenly diffused lighting.

There's a Reynolds Regulator for every Gas Control Requirement

For nearly half a century REYNOLDS Gas Regulators have proved their ability in a field outstanding for its rigid requirements.

Proper regulation at the station, in the line, in industrial plants, in the home—for every kind and type of pressure control equipment used in the gas industry, there is an especially designed product by REYNOLDS that will give satisfactory control limits, capacity range and economical operation over a long period of time.

REYNOLDS PRODUCTS

- High Pressure Service House Regulators
  Straight Lever Type—Models 0-10-20 Series
  Toggle Lever Type—Model 30 Series
- Low Pressure Service or Appliance Regulators
- District Station Regulators
  Single or Double Valve, Auxiliary Bowl and Automatic Leading Device Optional
- High Pressure Line Regulators
  Pilot-Loaded, Pilot Controlled
- Toggle Type Regulators
  Single Valve, Double Valve, Triple Outlet
- Seals
  Dead Weight or Mercury
- Relief Valves
  High or Low Pressure
- Back Pressure Valves
- Automatic Quick Closing Anti-Vacuum Valves
- Automatic Shut-Off Valves
- Lever Operated Valves
- Louver Operated Device
- Atmospheric Regulators
- Vacuum Regulators

REYNOLDS GAS REGULATOR CO.
Anderson, Indiana, U. S. A.

Gas Control Since 1892

"Food Secrets" Program Put On By American Stove Co.

The American Stove Co., manufacturers of the Magic Chef Gas Range, is now sponsoring the "Hollywood Food Secrets" program over KFI to 19 cities on the Pacific Coast. This Hollywood chatter program, featuring Delight Evans, editor of Screenland Magazine, marks the first time American Stove Co., a newspaper and magazine advertiser for 20 years, has used the radio as an advertising medium. Beginning March 13, to continue for 13 weeks, the Food Secrets program will close the middle of June.

The first broadcast of the program sold one stove as a direct result, brought in 45 requests for the free cook books containing Hollywood dishes, offered by the company, and secured six prospective stove customers.

In addition to the cook books the American Stove Co. is furnishing window display posters, two-color counter cards and newspaper mats to help dealers in merchandising the program.

■ ■

Payne Heads A.P.I. Eastern Production Division

Christy Payne, Jr., Peoples Natural Gas Co., Pittsburgh, Pa., was elected 1938-39 chairman of the eastern district, American Petroleum Institute's Division of Production, at the Eastern District spring meeting held in Pittsburgh, Pa.

Five vice-chairmen were also elected: F. A. Benkert, Peoples Natural Gas Co., Pittsburgh; T. H. Myers, Carnegie Natural Gas Co., Pittsburgh; D. T. Ring, The Ohio Fuel Gas Co., Columbus, Ohio; J. J. Schmidt, East Ohio Gas Co., Cleveland, Ohio, and O. W. Van Petten, Columbian Carbon Co., Charleston, W. Va.

■ ■

P.C.G.A. Manufacturers Seek Repeal of Labor Act

The Executive Committee of the Manufacturers Section of Pacific Coast Gas Association has passed a resolution to petition United States Senators and members of the House of Representatives to repeal the National Labor Relations Act and abolish the National Labor Relations Board.

Resolutions were prepared and submitted to the members who signified their approval by mail ballot.

■ ■

Record Gas Well Completed In Cut Bank Field, Mont.

The largest commercial gas well on record in the State of Montana was recently brought to completion in the north Cut Bank field. Glacier County, by A. B. Cobb. The Cobb No. 1 State gaged 40,500,000 cu. ft. of gas per day under rock pressure of 662 lbs. to the sq. in.

■ ■

Lone Star Opens New Field

The Lone Star Gas Co. has opened a new oil and gas field with a wildcat test well in Gray County, Texas. The well showed 35,000,000 to 40,000,000 cu. ft. of gas a day, but was shut in for repairs.

General Controls Co. Announces New Relay

A new relay, the "General RS 100," capable of handling single phase motor loads up to one hp. or heating loads up to 1.5 kw., is announced by the General Controls Co.

An exclusive feature of the RS 100, which, according to the manufacturers,

is designed specifically to meet the needs of the automatic heat, refrigeration, and air-conditioning industries, is an extra terminal for supplying power to wall clocks, indicating lamps, or small sensitive relays, eliminating the necessity for a separate low voltage source.

The relay is two-wire, normally open, and has large double-break contacts for freedom from contact trouble. A bulletin on this new relay may be had by writing the General Controls Co., 450 East Ohio St., Chicago, Ill.

■ ■

Gas Engine Generates Power For Packing Company

The Winchester Packing Co., Hutchinson, Kan., recently completed the installation of an 80 hp. International gas engine to generate electric power for the company's entire electrical power and lighting requirements. Packing company officials expect the gas engine generator to pay for the installation within a three-year period. The estimated increased gas consumption from this unit will be approximately 3000 M c.f. per year. For stand-by service the packing company is planning to install another 80 hp. unit.

■ ■

Government Plans Increase In Helium Production

A recent report from the U. S. Department of the Interior reveals that the government is planning to purchase the helium gas plants at Dexter, Kan., and Thatcher, Colo., and increase plant production. Although funds have not yet been provided for the purchase, the Girdler Corp., Louisville, Ky., owner of the plants, has agreed to sell at the valuation of $537,975.

■ ■

L. B. Crossman Dies

L. B. Crossman, assistant sales manager, Boston Consolidated Gas Co., died suddenly, April 26, in Durham, N. C.

For several years, Mr. Crossman was a member of the managing committee of the Industrial Gas Section, A.G.A., which he represented on the commercial bake ovens and counter gas appliances laboratories requirements committees.

The Goodman Stopper

The Reliable Shut-off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. **Gas cannot pass.**

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

Pac. Coast Rep.: C. B. Babcock Co.
475 Eleventh Street
San Francisco, California

Electrogas
FOR EVERY HEATING NEED
FURNACES
BLOWERS
FILTERS
WASHERS
Air Conditioning • Heating Equipment
WRITE FOR ATTRACTIVE DEALER PROPOSITION
ELECTROGAS FURNACE CO. 2575 BAYSHORE BLVD. SAN FRANCISCO, CALIF.

Protects gas users —

"CALODORANT" gives a swift warning against leak danger

CALODORANT gas odorizing agent has a distinctive and penetrating odor that is generally associated with manufactured gas. For over seven years leading gas companies have found it to be a vigilant detector of dangerous and costly leaks. Immediately upon the addition of CALODORANT to gas, it gives warning of leaks in distributing systems and household appliances—a warning that may prevent loss of life and property. CALODORANT will remain completely vaporized during long periods of transmission and the odorizing power remains unimpaired. It adds no odor to burning gas. It is non-corrosive — non-injurious to equipment or users.

CALODORANT

Reg. U. S. Pat. Off.

GAS ODORIZING AGENT

Available in tank cars and iron barrels

Address Inquiries to

Standard Oil Company of California

225 Bush Street, San Francisco, Calif. **30 Rockefeller Plaza, New York, N. Y.**

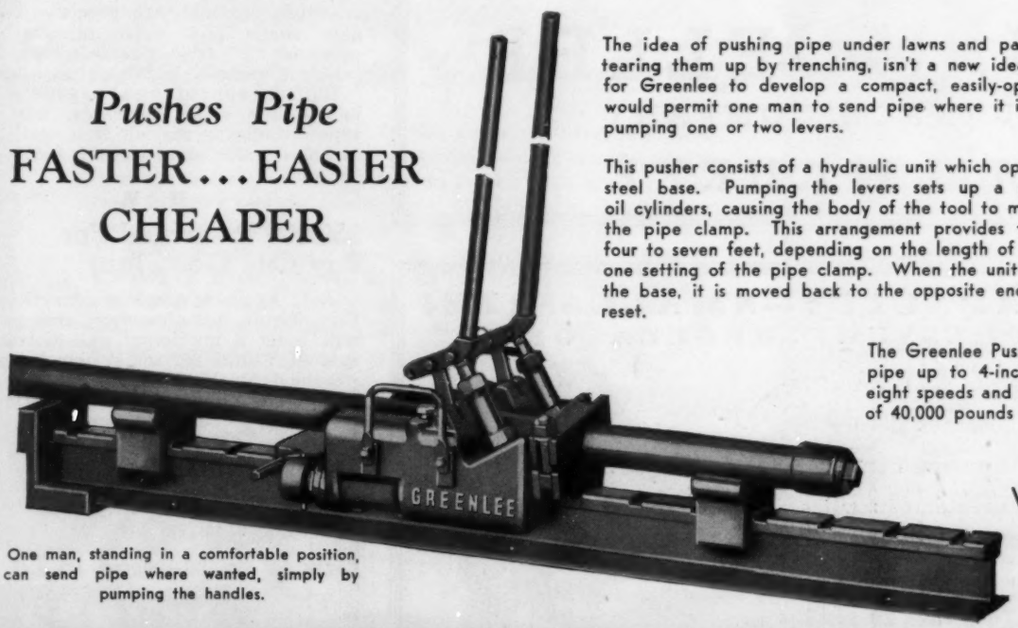
Use the Greenlee HYDRAULIC PIPE PUSHER and Leave Lawns and Pavements Undisturbed

Pushes Pipe
FASTER...EASIER
CHEAPER

The idea of pushing pipe under lawns and pavements, instead of tearing them up by trenching, isn't a new idea. But it remained for Greenlee to develop a compact, easily-operated pusher that would permit one man to send pipe where it is wanted, simply by pumping one or two levers.

This pusher consists of a hydraulic unit which operates on a notched steel base. Pumping the levers sets up a pressure within two oil cylinders, causing the body of the tool to move forward against the pipe clamp. This arrangement provides for a push of from four to seven feet, depending on the length of base used, with but one setting of the pipe clamp. When the unit reaches the end of the base, it is moved back to the opposite end, and the clamp is reset.

The Greenlee Pusher has capacity for pipe up to 4-inch, is provided with eight speeds and will exert a pressure of 40,000 pounds on the pipe clamp.



One man, standing in a comfortable position, can send pipe where wanted, simply by pumping the handles.

WRITE NOW for COMPLETE DETAILS

GREENLEE TOOL CO., 1700 Columbia Ave., ROCKFORD, ILLINOIS

Los Angeles Co.'s in Building and Redecorating Program

TWO of the eight or ten construction jobs now under consideration by the Southern California and Southern Counties Gas companies were started during the last two weeks of May.

Southern California Gas Co. filed a request for a permit to construct a one-story steel and concrete branch office building at Southgate, cost to approximate $8700.

Southern Counties Gas Company let a contract to Ryan A. Grut to build a $13,000 distribution headquarters building on Rose Avenue in Venice, on property adjacent to the gas plant. The land was purchased last year at a cost of $30,000.

Plans for other structures in the Southern California Gas Co. system are being drawn, it is understood. To be included among these is a new branch office building for the Lincoln Heights District, Los Angeles.

In addition to this building activity, Southern California Gas Co. is carrying forward a program of redecoration, modernization and improvement throughout the company's branch offices in Los Angeles.

■ ■

Eckenroth Register Issues Folder on Wall Registers

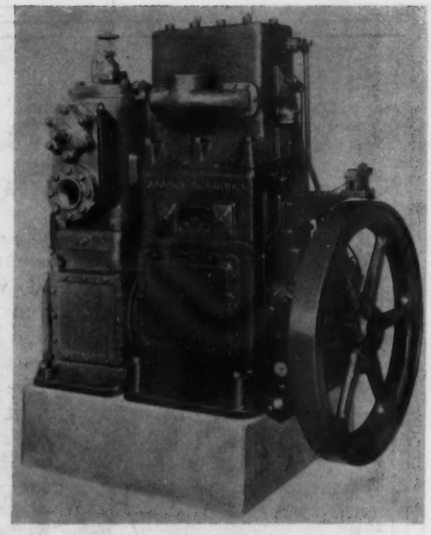
The Eckenroth Register Co., Inc., San Francisco has issued a six-page folder on its "All Season" Combination Air Conditioning Wall Registers. The No. 650 series register is designed for replacement of standard baseboard registers on new or changeover air-conditioning installations. The No. 700 series is a new design of air-conditioning registers for residential installation.

The pamphlet carries illustrations of and specifications for both types.

■ ■

Meat Market Selects Gas For Heating Smoke-House

Sawdust makes the smoke, but gas is what ignites it and automatically maintains the proper temperature in a new smoke-house installed at the Lincoln Kosher Market, Portland, Ore. Gas was considered the ideal fuel for the installation. This installation was made with the cooperation of the industrial department of the Portland Gas & Coke Co.



Cooper-Bessemer Announces New 40-50 Hp. Compressor

The Cooper-Bessemer Corp., Mt. Vernon, Ohio, announces its new Type G-MS compressor unit. Rated 40 to 50 hp. at conservative speeds, the unit is a combination of the Type G-SD vertical pumping engine and a vertical compressor cylinder.

Designed for delivering gas into high pressure lines, compressing air and refrigeration gases, etc., the Type G-MS compressor is light weight, rugged, compact. Easily transported, requiring a minimum amount of floor space and housing, and convertible for gas or oil fuel, the compressor can be arranged for two-stage operation through the addition of a second compressor cylinder mounted horizontally on either side of the compressor base.

The engine is a crosshead type with tapered roller bearings for its main shaft and is fully pressure lubricated. Its crankpin bearings are precision removable shells and wrist pins are the patented "T" type. Crosshead pin bearings are removable bronze bushings.

Built-in centrifugal water pump, heavy-duty roller bearings, advanced-type crossheads and all iron castings of Meehanite Metal are other features of the unit.

■ ■

$50,000 Presented For Bay City Gas Plant

J. C. Lewis of the city council of Bay City, Texas, has announced that the city will build a municipal gas distribution system. Funds for the system have been provided by V. L. Le Tulle, who has presented $50,000 to Bay City. The money is to bear six per cent interest to Mr. Le Tulle until his death, at which time it will be a gift to the city.

The Texas Natural Gas Co. is serving gas to the city at the present time.

■ ■

Gas to Be Metered in La.

William G. Rankin, Louisiana Conservation Commissioner, has recently ordered that all gas produced from wells on the Louisiana side of the Rodessa field be measured continuously by meters.

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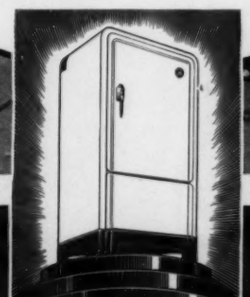

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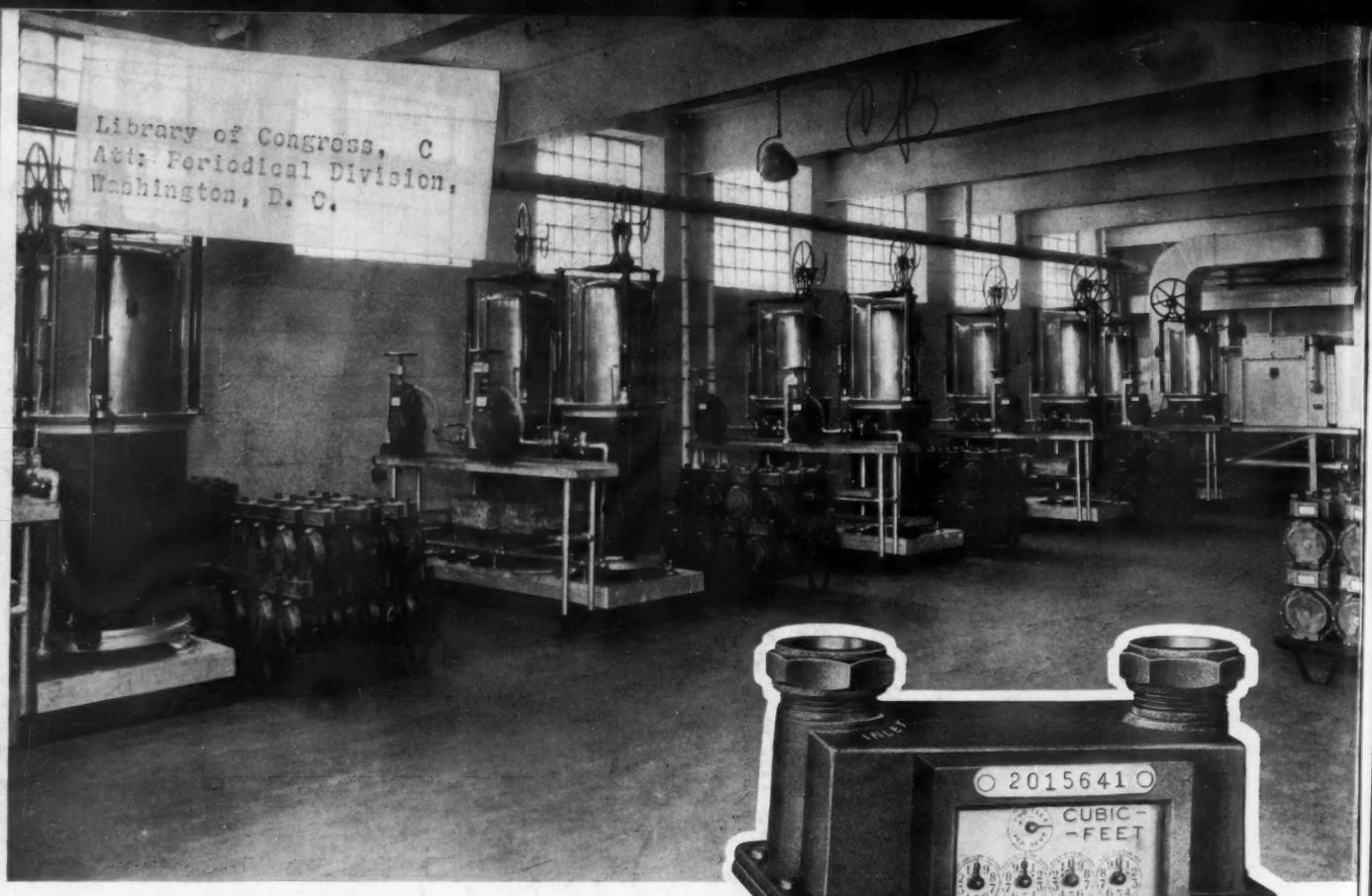

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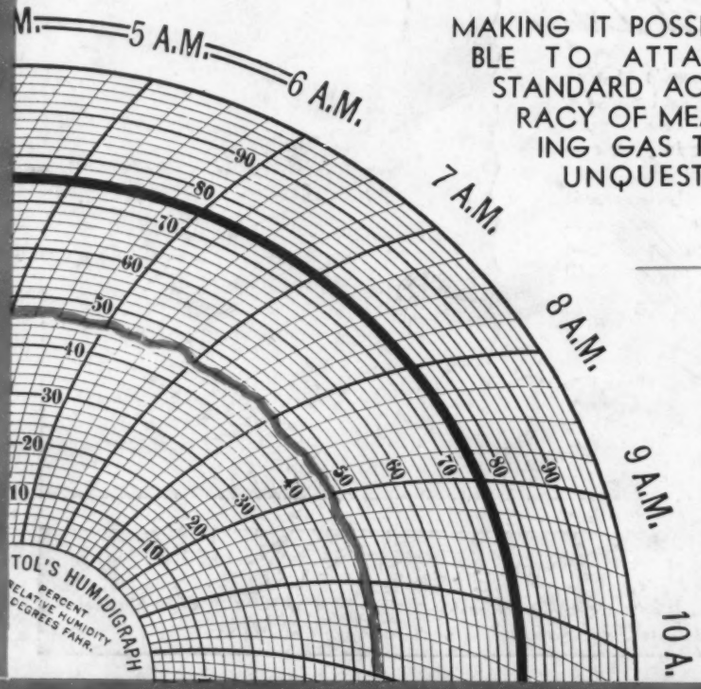

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